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Vol 4 No 33

# Clive fights on as rescue fails

SINCLAIR is in trouble once more after Robert Maxwell's takeover bid has collapsed.

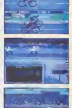
Following a £10m order from Dixons for the Spectrum Plus, QL and Flat screen TV, however, Sir Clive Sinclair claims that no refinancing package for Sinclair Research is now necessary

Dixon's is to sell the Spectrum Plus in a special pack together with a joystick, joystick interface, data recorder, and ten software titles, all for £139.99

Publishing magnate Maxwell's decision to pull out of the rescue came after accountants Coopers and Lybrand

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SPECIAL RUNNING JUMPING FLYING ISSUE






# Amstrad sneaks out 128K

AMSTRAD has – without any announcement – quietly slipped its new 128K disc-based micro, the CPC6128, into the stores – priced at £399 for the colour monitor version and £299 for the monochrome version

The move has fuelled speculation that the 64K CPC664 model, only announced in April, may now be dropped. The CPC6128 prices actually undercut the CPC664 which sells for £499 (colour) and £349 (green screen)

G and E Computer Electronics of Tottenham Court Road in London, one of the first shops to actually have the 6128 on sale last Wednesday immediately cut the price of its colour 664 models in stock to the same price as the new machines – £399

'We took ten of each ver-

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## EDITORIAL

With the news that the proposed take-over of Sinclair by Robert Maxwell has failed, the future of the UK's most famous micro company is once more in the balance.

That the negotiations have broken down is in itself no surprise. Right from the start even the basic details of the deal were clouded in mystery and in the last week or so the Maxwell camp had seemed to wish to distance itself from Sinclair.

Sir Clive himself is putting on a brave face. In one report he claimed he has already raised a replacement £12m from an unnamed alternative source without having to give up control of the company he founded because of recent sales successes — in particular the deal with Dixons. Despite the initial small-scale success of the QL in the US though, the company's cash problems have apparently hampered attempts to meet demand.

The uncertainty at Sinclair could not have come at a worse time for the company. It is now that it needs money to buy components to build the computers for the Christmas market and also to launch and promote this year's new products. It desperately needs to press ahead with plans for its 128K Spectrum and a new 512K micro based on the QL technology with a built in disc drive wouldn't go amiss either. Yet it now isn't clear if Sinclair will be able to find the money to fund such schemes, especially as his problems with the C5 vehicle are also growing.

The substantial order from Dixons will undoubtedly help to ease the short-term cash problems. However, in the longer term only another top selling machine like the Spectrum will help.

And Sinclair has never been pressed so hard. Amstrad, sensing blood, has rushed out its 128K machine with built in disc and monitor at an aggressive £399.

At that price Commodore must be sweating. Acorn with its BBC Plus with neither disc or display at £100 more ought to be quaking.

Sinclair's new micro will have to be pretty spectacular to match Amstrad's onslaught.

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**Computer Trade Association Magazine of the Year**

# Acorn set for £20m loss

ACORN has announced an estimated loss of around £20 68m for the year to June 30 This compares with a profit of £10 8m for the previous year

Turnover showed an estimated slump from £54 9m in the six months to December 31, 1984 to £22 69m

The expected results were circulated at the same time as Acorn notified its shareholders of details of its second rescue by Olivetti (see *Popular Computing Weekly*, August 1). Under the new deal, Olivetti's share in Acorn will be increased from 49.3% to 79 8%, while the publicly owned portion of Acorn will fall from 10% to 6%

Once the refinancing package has been implemented, Alex Reid is to resign as chairman, and Chris Curry and Hermann Hauser will resign as deputy chairmen. Alex Reid's place will be taken by Olivetti director Alas Uboldi, whose previous post as managing director has already been filled by Brian Long

## Amstrad 6128 sneaks out

continued from page 1

sion of the new machine, colour and monochrome monitors as a first order, and they all sold out within a day", said a spokesman for G and B "They are proving very popular "

Laskys and Selfridges were also selling the Amstrad 6128 last week, while Boots and Rumbelows were expecting their orders to arrive within the next week or so

Most retailers are now not planning to reorder 664s. Lasky's, which only began stocking the Amstrad range with the 464 and 6128 last week, has decided not to take the 664 at all

Boots has never stocked the CPC664, although it has been selling the 464 for some months now, and it has ordered 6128s

Terry Greenwood of Rumbelow's said, "We have no idea what we will be selling the 664 for, and our stock levels are not high We won't be reordering the machine – I'd be surprised if anyone did

"Amstrad is probably fully aware of the consequences of selling the 6128 at that price "

Amstrad has apparently been pressured into releasing the 6128 in this country somewhat ahead of schedule because of new 128K machines being planned for this autumn by Commodore and Sinclair

## Sinclair deal falls through

continued from page 1

reported to merchant bank Hill Samuel on the prospects for Sinclair Maxwell said that the plan for Maxwell's company Hollis to buy a controlling stake in Sinclair "just did not gel" and Hill Samuel felt it could not recommend the rescue to Hollis shareholders

The Sinclair board has been meeting major creditors this week to reschedule payment of debts Sir Clive claims that the Dixon's deal obviates the need for any refinancing, and that sales of Sinclair products are now back to 80% of the figure for the same period last year. Much of this recovery is attributed by Sinclair to sales of the QL in the US, where it is available by mail order About 35,000 people have requested more details of the QL

Nigel Searle who is heading up the US operation said, "We have been shipping the QL to customers since June The demand has been high, although we have tailored our marketing efforts to match the extent of production. Sinclair's finances having been restricted.

"So far we have beens selling I think to enthusiasts — loyal Sinclair owners who had ZX80s and ZX81s By the end of 1986 I expect we will have spread sales to general consumers "

left Sir Clive Sinclair
right: Robert Maxwell

Sir Clive is, however still looking for investment for the wafer scale integration plant planned with ICL chairman Robb Wilmot Sir Clive also claims three other parties who expressed interest in Sinclair before Maxwell made his offer with whom he will now restart talks

'We will continue to look for financing for the new products in the pipeline as before, said a Sinclair spokesman "We're not saying now that everything's 'roses round the door', but there is light at the end of tunnel."

# Anarchy looms as *Young Ones* sign up

THE YOUNG ONES television comedy series is to be turned into a computer game, to be released by Orpheus Software in October.

Orpheus's John Marshall explained the game takes the form of an interactive icon-driven adventure "You choose which character you wish to be — Neil, Rik, Mike or Vyvyan — and the computer plays the others There are always four characters in the game and the actions of each reflect their own particular view of the world "

The plot of the game is closely based on the original scripts from the TV series with additional material written specially for the game by the series' three script writers, Rik Mayall Ben Elton and Lise Mayer

Said Paul Kaufman at Orpheus, 'Each time you play the game is different because even if you select to play the same character every game the other three computer controlled players don't do the same things

"Neil, Rik, Mike and Vyvyan each have different tasks to perform, depending on their characters "

Nigel Planer as Neil

The game will be previewed at the *Personal Computer World* Show in September before release in october for the Commodore 64, Spectrum and Amstrad machines

## World Cup win for US Gold

US GOLD has announced a licensing deal with the international football association, FIFA, for the official Mexico '86 World Cup computer game next year

The game will actually appear on the UK Gold label, used by US Gold for British originated products

US Gold plans that the game should be ready two weeks before the Mexico finals begin in summer 1986 As well as soccer games, it will have a World Cup winners betting forecast program.

Commodore, Spectrum and Amstrad versions are all planned at a provisional price of £8 95

More news on page 6




**SPECTRUM 48K**





# British Telecom buys EDOS firm

ELECTRONIC Software distribution has been given a boost with the decision by British Telecom to take a majority shareholding in Program Express, the first UK company set up to introduce the system into retail stores

Electronic distribution of software (EDOS) uses machines in each store which will down-load software from a central main-frame computer on to a blank tape, cartridge or disc

Advantages of the system are that retailers will not suffer overstocking, shoplifting or selling-out problems The EDOS machine will also keep a record of titles sold, and will invoice the store

Program Express, which announced its system in July last year had hoped that trial machines would be installed by the end of last year However, the company has had difficulties in getting equipment from Inventory Transfer Systems in the US which manufactures the machines and as yet there are still no EDOS systems in the shops

Under the new agreement, British Telecom—which owns the Firebird entertainment software label— will provide the financing for EDOS, while Program Express's directors Grant Robertson, Bruce Neville and Gilmour Kennedy continue to run the company

"We hope that EDOS will now reach some stores by the end of this year In three to five years we plan to have penetrated all retail outlets," said a BT spokesman

One chain that may take advantage of EDOS are British Telecom's own shops, selling mainly telecommunications equipment but also Firebird software British Telecom is planning to expand its network of shops in the country to around 50

AMSTRAD 6128 AMSTRAD 664

Or for the same price you could have something in blue with a smaller memory

## Gargoyle goes for SF games

HAVING written a graphic authoring system for their new science fiction game, *Marsport* (see picture), Gargoyle Games plans to use it for a "just for fun" game, according to Greg Follis one of the company partners

"It's going to be called *Sweevo's World*" he said Sweevo stands for Self Willed Extreme Environment Vocational Organism. It's a little robot you have to control, but Sweevo has gone a bit wrong somewhere – he's clumsy and not all that bright, and he falls over a lot."

*Sweevo's World* will be released in early November on the Spectrum 48K and the Amstrad at £7.95

Gargoyle's *Marsport*


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## John Cook has been in (and out) of the pits all week

When is a simulation not a simulation? When you find yourself lying down inside a Formula Ford 1600 moving at what seems to be at least 350 miles per hour, six inches off the ground, and it feels like the Big Game Over could be just around the corner – that's when.

There's no doubt about it, the one thing that all racing simulations lack is the element of pure fear. On the other hand, if you do write off a car while playing, say, *Revs*, at least you don't have to pay out the large five figure sums for a new motor. And then there's playability ... what's the point of having an ultra-realistic simulation that takes two years to master, and bores you to tears?

Bearing all this in mind, we decided to judge our survey of racing simulations using the three parameters of Realism, Fear Factor and Playability ... now read on.

Naturally, on the back of the grid we find the older games – fair in their time, but now ... I guess they might just be showing their age.

**Grid Position Ten.** *Chequered Flag* from, of course, Psion, might be a contender for Grand Daddy of them all, written for the Spectrum. At one time in the six pack bundle, it *is* surprisingly still one of the few racing programs for the rubber-keyed wonder. Two years ago it was good, but now ... well ... two years is a long time, isn't it? Enough said. *Realism 5/10, Fear Factor 4/10, Playability 5/10*



*Revs from Acornsoft*

**Grid Position Nine.** *Enduro* – another oldie which first came out, I believe, for the Atari VCS games machine. Another early V-perspective job, with simple left/right, faster/slower controls. The object here is to overtake a set number of cars in a driving day, as driving conditions vary according to the terrain and time. This one certainly does capture the boredom of long-distance driving in a big way. The other cars act like moving brick walls, it's one player only and not really worth looking at nowadays. *Realism 8/10, Fear Factor 3/10 Playability 5/10*

**Grid Position Eight.** The Amstrad is still short of a really decent racing game although Amsoft promises that there is something special in the pipeline. At this time, however, you have to make do with *Grand Prix Rally II*. Coming out of the same conceptual stable as *Enduro*, you drive what looks like a souped-up Capri along various sections of road. Simple controls again ... and more moving brick walls, but more colourful than *Enduro* itself. *Realism 6/10, Fear Factor 6/10, Playability 6/10*

**Grid Position Seven.** Activision's *Great American Road Race* is yet another *Enduro* derivative, but as you would expect, more complex and polished. Your aim is to race across America over various stages. Low and high gears are included as well as left/right. Strategies are to avoid, 1) rush hours near towns (!) and 2) running out of fuel in between stages. Of its type, not bad. *Realism 6/10 Fear Factor 6/10 Playability 7/10*

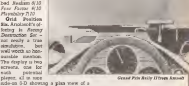
**Grid Position Six.** Ariolasoft's offering is *Racing Destruction Set* – not really a true simulation, but well worth an honourable mention. The display is two screens, one for each potential player, all in nice side-on 3-D showing a plan view of a section of track. This is really a simulation of a simulation – slot car racing – but its virtue lies in great playability, and flexible option selection. *Realism 5/10, Fear Factor 6/10, Playability 8/10*

**Grid Position Five.** From Audiogenic comes *Talledega* – a kind of Indy 50 simulation where you spend most of your time travelling at 250 miles per hour ... or 294 mph with the turbo on. A particularly noisy game and one with a few strategy elements, such as the need for pit stops to refuel, change tyres, or even change engine! Not bad at all. *Realism 6/10, Fear Factor 7/10 Playability 7/10*

**Grid Position Four.** *Pole Position* was a hit in the arcades, and has converted quite well to Commodore, Atari and even Spectrum. You qualify, get a grid position, then race against a full field. Again, only low/high gears, but you skid pretty convincingly and crash spectacularly. What more do you want? *Realism 7/10, Fear Factor 7/10, Playability 8/10*

**Grid Position Three.** Kempston are well known for their joysticks and interfaces – perhaps with *Chicane* (at present on BBC only) they might make a name for themselves with software. This program is a result of a collaboration between Kempston and a Formula Ford racing team. It features a choice of six circuits to race around and quite a good 'out of the cockpit' view of the track. Lots of gears to choose from (luckily all with syncromesh) accelerator and brakes. Although entirely adequate, however, it never really delivers as a full blown simulation, and perhaps the playability is let down by the multitude of controls. *Realism 7/10, Fear Factor 6/10, Playability 7/10*

**Grid Position Two.** *Pit Stop II* is, to date, the most playable two-player racing simulation game available – and I bet US Gold are converting it from Commodore 64 to Spectrum as fast as the little bytes can travel down the interfaces. Similar in concept to *Talledega* (and naturally *Pit Stop I*), like *Racing Destruction* it has a separate playing window for each player. Strategy plays an important part – as does speed and skill. Very, very playable indeed. *Realism 7/10, Fear Factor 7/10, Playability 9/10*



*Grand Prix Rally II from Amsoft*

**Grid Position One.** *Revs*, on the BBC B from Acornsoft, is really one in a field of one. Having driven a Formula Ford 1600, I can promise you that playing *Revs* is the nearest thing you *can* come to driving a racing car without risking your neck. The handling, the impression of speed ... and some of the tension! This has the lot; even the opposition are smart and fast. The number of controls make it a little hard to get into, but once mastered cause no problem.

The bad news – conversions look to be unlikely ... this is bordering on tragedy (if not commercial insanity!), so it's worth it for budding Formula Three drivers to beg/steal/borrow a BBC B in the close season. Go away and drive it into the sunset. *Realism 10/10 Fear Factor 9/10, Playability 8/10*

# Christina Erskine puts sports games through their paces

Sports simulations are a strange area of the games computing market. People talk quite readily of the realism of such programs, yet I can think of no sport at all where technique remotely relates to using a keyboard. Daley Thompson did not achieve his decathlon with a Quickshot joystick.

I have resigned myself to the fact that a ten minute work out a day with *International Football* is not going to give me muscles like Grace Jones.

Recently the range of sports given the micro treatment has widened enormously – whitewater canoeing, ice hockey, round the world yachting, and, even, fishing.

Psion's *Match Point* (Spectrum, C64 and QL) is one favourite I return to. Although the first tennis simulation for home micros when it came out on the Spectrum over a year ago, I reckon it's still the best. The graphics are crisp, movement smooth, and after a fair bit of practice, you get to the stage where you really can select shots. Some of the service decisions – the faults and net cords – seem a little arbitary, but it's certainly playable.

Commodore's newly released *International Tennis* features all the authenticity of *Match Point* but a more sophisticated game. The graphics are chunkier, there are more skill levels, and choice of shot depends on exact positioning of the joystick, since it uses all the diagonals. This means you need a good quality joystick to play effectively. However, it is only available for the Commodore 64.

Amsoft's offering, *Centre Court*, is very amateur by comparison, and *Superbrat* (Spectrum) from Atlantis, while tremendous value at £1.99, is definitely a non seed.

Cricket on the computer seems to have a fairly select following. *Tim Love's Cricket* (Peaksoft) and CRL's *Test Match* had the field pretty much to themselves until this summer when the big names moved in. Audiogenic signed up Graham Gooch and Tynesoft took on Ian Botham.

*Graham Gooch's Test Cricket* (Commodore) – the better of the two – uses a simplified graphic representation of the infield, and cuts occasionally, television style, to the boundary when a fine stroke has been played. It includes authentic looking scoreboards, and as few controls as possible to play the game.

You can play in one of two modes: arcade or simulation. Simulation mode is intended to let you watch a match, with a limited facility to control the play – making the batsman play more aggressively, for example. It is astonishingly passive.

Things get a bit more lively in arcade mode, but you still only get to control the timing of you, batting stroke, not positioning. Get the timing right, and the ball soars off towards the boundary. Get it wrong and you will almost certainly be out before the end of the over. Then there will be a tearing noise, as if Ian Botham has just ripped his shirt, but it is only the crowd applauding.

So far, in my endeavours with *GGTC*, Graham Gooch himself has never scored more than six in an innings. He was abysmal too when the program put him on to bowl, *and I think he should be told*.

The recently released *Hypersports* (Spectrum and C64) from Imagine inevitably invites comparison with Epyx's *Summer Games* and now *Summer Games II*.

*Summer Games* won me over with the superb graphics and complex controls which gave a very realistic appearance on screen. *Hypersports* uses slightly fewer controls, and I'm not sure that this is a good thing.

The biggest drawback with *Hypersports* is that you cannot select which sport to play, you have to go through them in strict order – swimming, skeet shooting, pummel horse, archery, triple jump and weight lifting.

*Match Point from Psion*

*Summer Games II* – now released – is if anything better than its state-of-the-art predecessor *Summer Games*. Eight new events are featured – triple jump, rowing, javelin, show jumping, high jump, fencing, cycling and kayaking. The animation is superb and, like the original, the attention to detail is excellent. The show jumping event is probably the cleverest bit of programming, by the kayaking is also incredibly difficult.

Now that the C64 Epyx titles are sold through US Gold, prices have come down. The program costs under £10 on cassette, under £15 on disc.

Other multisport games, such as the two Decathlons, from Activision and Ocean (Daley Thompson's) must have almost played themselves out by now, although I notice that *DT's Decathlon* is rapidly becoming software's answer to *Dark Side of the Moon*.

Football may be the national game, but there are surprisingly few football games on the market. Ocean's *Match Day*, Commodore's world best seller *International Football*, and now Anirog's *Five-a-Side* are the ones which spring to mind on the C64. *International Football* on the C64 still looks the best, although graphically they all use similar techniques, while Anirog's includes a truly menacing chant of 'Here we go, here we go'.

Slightly more esoterically, recent releases include *Tour de France* from Activision and *Nick Faldo Plays the Open* from Mind Games. Imagine also has *World Series Basketball* on Spectrum, C64 and Amstrad.

*Tour de France* as far as I know is the first cycling simulation available. With much attention to realism, you must complete each of 16 stages of the legendary race, from the streets of Paris to the Pyrenees. Your main controls are directional – no short cuts across the grass allowed – and acceleration and gear changes. I feel there may be a danger of it becoming monotonous after the first few stages, probably not a good idea to attempt to tackle the entire tour at one sitting.

*Nick Faldo Plays the Open* reminds me of a very, very old golfers joke about a gorilla who challenges Tony Jacklin. At every tee, the gorilla delivers a perfect drive plum on to the green, so that Jacklin, gentleman that he is, tells the gorilla he needn't bother to putt out. By the 18th green, Jacklin is so aggrieved he demands the gorilla should complete the hole, whereupon it performs another 300 yard drive and it dawns on Jacklin that is the only thing it can do.

*Nick Faldo* uses the fashionable disembodied pointing hand for pseudo-icon menu selection – parameters being direction, strength, choice of club, and taking the shot. This takes up the bottom third of the screen, the rest comprises an aerial view of the fairway and your ball.

So far, so good. Unfortunately, on the Spectrum, once you reach the green the picture of the pin and your ball has become so tiny that it is difficult to make out exactly where it is. After some playing I can drive quite well, but I cannot putt at all.

# Graham Taylor sorts out his flaps and takes to the air

The thing about flight simulations is that there is a grave danger that what's accurate is also boring and unplayable. Giving somebody 24 different controls to operate may accurately reflect really flying a plane, but it may not be that much fun.

That said, there's something prestigious about flight simulations that gives the best ones a longevity way beyond other games. When a new machine is launched it's pretty important that (along with *Chess*) a flight simulation is available fairly quickly.

On the Spectrum for a good long time Psion's *Flight Simulator* held sway – it simulated a light aircraft and used the basic vector graphics found in all the other simulators, but the screen was slow to up-date, consequently it looked jerky and responded slowly to commands. Highly rated at the time, it now looks fairly primitive.

In contrast, Digital Integration's *Fighter Pilot*, which effectively replaced the Psion offering, remains a compelling and relatively undated program. The game runs much more quickly, so the 3D effect and the rate at which it responds to your commands is that much more impressive. It has one other major virtue – whilst like the Psion program it remained a fairly precise representation of flight, it lets you blow other aircraft to bits with air-to-air missiles.

Digital Integration converted the program very effectively to the Amstrad recently and also the Commodore – arguably less well, mainly because of the Commodore's slower processor. But in all its versions *Fighter Pilot* remains a first choice for those wanting a simulator with both technical accuracy and zap 'em up playability.



*Red Arrows* from Database

Commodore 64 owners have a wider choice of simulations and indeed perhaps the best 'purist' flight simulation on any home micro: *Flight Simulator II*, by US company Sublogic. This recreates a Piper 181 Cherokee Archer and has an intimidating number of controls – so intimidating and accurate, in fact, that the program is sometimes used as a prelude to actual flight in training schools.

High spots in the game include a vector graphic of the statue of Liberty and a choice of day/night flying and weather conditions. The only problem with the game is the degree of skill required to master it – this is not for the idly interested, it requires a lot of practice.

*Super Huey*, by Audiogenic in this country, is a similarly complex simulation but features a combat helicopter. I counted 29 different indicators and gauges, the joystick uses a variety of modes and all the diagonals for a subtle series of variations in control. Helicopters are, if anything, harder to fly than aircraft and this program makes few concessions to the novice. It does feature combat and a host of other game options and is potentially very addictive, but like *Flight Simulator II*, requires a lot of stamina.



*Flight Simulator II* from Sublogic

For those whose interest in simulations is more death and destruction than the exact angle of flap, *Flyer Fox* is one of the most impressive, fast and action packed of the lot. Graphics, particularly of the enemy planes, are good enough to make the game really involving.

*F15 Strike Eagle* from Microprose is for those who want a little more than *Flyer Fox's* zap-zap-zap in terms of complexity but who still don't want to have to spend days mastering how to fly the plane.

Anirog has the first jump-jet simulator with *Jump Jet* on the C64.

Back to pure flight simulations and the recently released *Spitfire 40*. It lets you fly the classic warplane in both training flights and full combat. The game is marked by extraordinarily detailed graphics representing the control panel with dials and other controls accurately representing the current flying information.

The problem with *Spitfire 40* is that all the clever graphics mean that up-dating of the screen is very slow indeed. This not only means that it responds rather slowly to commands, it also makes the 3D vector graphics rather slow to be up-dated and some people find this aspect rather detracting, it certainly slows the game down.

*Red Arrows* from Database Software (Spectrum, Amstrad and Commodore 64) not only simulates the Hawk training jet, but lets you fly as a member of the Red Arrows team, joining them in a collection of fiendish rolls and spins and going berserk with the thrust, brake, spin and roll commands. It's horrendously difficult to do and only absolute addicts should try it. Graphically it's only fair – the other aircraft are built up from simple block graphics and are there more for visual reference (ie, to find out whether you've managed to remain in any sort of formation) than gosh-wow realism.

The BBC is less well served with flight simulators, perhaps because of the reduced memory available. Easily the best of what's around is *Aviator*, a Spitfire simulation that uses vector graphics *à la Fighter Pilot*. The aircraft handles very realistically and the ground below has occasional towns and bridges. The most bizarre aspect of the whole game, though, is that if you survive long enough you get to do battle not with the dreaded Hun, but a collection of alien triangles. It's only in black and white but nevertheless runs quickly – one of the best simulations visually.

Armchair pilots, at least on the Commodore and Spectrum, certainly have a wide choice and though there are some obvious first choices, it's worth considering exactly what you require before you take off to the shops. Do you really want something that is incredibly exact but has a manual with 20 pages, or do you basically only want to kill lots and lots of enemy planes without constantly checking your flaps and torque?



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# Fasten your seat belt

*Top simulations company Digital Integration are switching from F15 to Apache* **Graham Taylor** *flew south to find them*

Fighter Pilot from Digital Integration was not only the best flight simulator for the Spectrum, it was also the only simulator that let you do what everyone secretly wanted to do with their flight simulators anyway – blast enemy aircraft from the skies

Digital Integration is Rod Swift and David Marshall, who met whilst working for the Ministry of Defence in Farnborough on military computers, and them put together a small team of programmers

In a previous MoD job Dave had worked on 'real' simulators for the military and whilst there are some comparisons between that work and developing *Fighter Pilot*, there were also some unexpected differences

"Whilst obviously there are major technical differences between what is possible on the home micro and what a military simulator is capable of there's another point

"A military simulator is very precise in reproducing the precise quirks of an actual plane, the kind of unusual and sometimes unexpected handling characteristics that would be misplaced on something which is intended primarily to entertain."

That said, Digital Integration goes to a lot of trouble to make the handling characteristics as accurate as possible This extended to getting hold of bundles and bundles of technical information issued by the manufacturers of the F15 fighter plane featured in the game, distilling the main details of acceleration, top speed fire power, manoeuvrability, etc, into hard information to be incorporated into the program

So accurate was it, in fact, that it is now used by a number of flying schools and is also being sold connected up to actual aircraft instrumentation and controls as a low cost (around £400) 'real' flight simulator

A similar procedure has been followed in the development of *Tomahawk* – the helicopter 'follow up' to *Fighter Pilot* that has been over a year in development and is based on the A4-64A Apache helicopter The game should be out well before Christmas Said David, "When we began work on the program I sent to Hughes for technical reports

"It's a strange situation, they will never answer my question directly but instead send batches of technical books and leaflets from which the information can be gleaned" David showed me a collection of articles with odd facts buried in the text picked out with a yellow marker pen It's a painstaking business that takes a long time – before any actual coding begins

"A helicopter works quite differently to an aircraft," explained David. "In an aircraft the variation of thrust on the fixed wing is used for lift, in a helicopter thrust tends to remain close to maximum We also have to replicate things like the way the rotors are tilted"

Assumptions about what is possible on the Spectrum have also changed. *Fighter Pilot* had graphics for four runways and that was about it, so far as 3-D representation went. In *Tomahawk* there are around 5,000 including forests, buildings, landing pads which are represented in vector graphics and from potentially six different angles You can, if you're clever enough, actually fly through the forest.

The game features, like *Fighter Pilot*, a whole selection of baddies that can be blasted from the sky using air-to-air missiles and other weapons of destruction It's going to be a lot of fun. Were there, I wondered reasons why Digital would not implement simulation features on a game other than technical ones "People want to shoot things and mustn't be over burdened with too many complex controls – we've simplified the controls tremendously on *Tomahawk* so that they can be represented on the keyboard, in the real machine so much is interlinked."

Digital Integration use development computers like the Cal PC, but most testing of program modules is done on the actual Spectrum

"We have a vast library of routines which are held as *Wordstar* files, source code can be assembled and to a certain extent tested on the Cal, but unlike the Vax you can't totally simulate the Spectrum."

Much time recently has been spent on the algorithms for the 3-D routines for *Tomahawk* (and beyond – the routines are not machine specific)

"We set ourselves the basic parameter that screen up-dating of information mustn't take longer than a quarter of a second Then we had to find ways – mainly better maths – to do more and more things in that time We've been able to handle 30 objects in that time on *Tomahawk*, rather than one, the runway, in *Fighter Pilot*"

For that reason David and Rod are still reasonably optimistic about the future software on the Spectrum. "Certainly we are hitting some limits but in other areas there could still be tremendous scope for development."

Aside from *Tomahawk* there are other projects under development. Rod is working on *TT Racer* a simulation based on a Suzuki 500 and featuring accurate representations of the European Motor cycle Grand Prix "The outside view will be as though you are sitting on the back of the bike The idea is to give it the kind of excitement and sense of speed you feel when a camera is mounted on the side of the bike"

*TT Racer* will be on the Spectrum, but before this comes out Digital will release *Speed King* on the Commodore 64, written by M Estcourt who came to the company after reading that David much admired his program *Death Chase* It's a bike race game with some of the best use of multi-sized sprites to give the illusion of perspective ever seen – you hardly notice the sprite up-dating as other bikers on the track move towards you.

David and Rod offered dark hints about future Digital plans but would not be drawn David would only say "We have been considering the idea of using some of the 3-D techniques in what I could loosely call a role playing adventure It could be quite spectacular but it's only at the earliest stages of development and is unlikely to be released this year"

Digital Integration take their simulations seriously Surprisingly so, as was revealed when I asked them why they had never attempted something like a Space Shuttle simulation.

"We were going to, but as we were about to get underway we realised that when the shuttle lands it just glides in on automatic control – it would have been incredibly boring"

How many other companies can you think of who would be daunted from producing a game because it didn't reflect the real world?

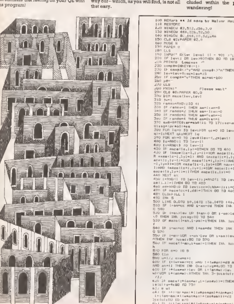
# 3-D Maze

**A 3-D Maze game for the Sinclair QL written by Halvor Heuch**

Ever felt that your ware just going round and round in circles, achieving nothing? Well, now you can simulate that feeling on your QL with this program!

This will generate a maze, showing your place within it in glorious 3-D. You now have the task of trying to find the way out – which, as you will find, is not all that easy.

Using the compass function might help, but the diehards will try wander ing around unaided. Instructions are included within the program – happy wandering!



```
100 REMark ** 3d maze by Halvor Heuch **
110 RESTORE
120 WINDOW #2,512,256,0,0
130 WINDOW 448,226,32,20
140 WINDOW #0,444,10,32,246
150 CLS #2:PAPER #2,0
160 MODE 8
170 PAPER 0
180 CLS
190 INPUT" Enter level (1 - 90) >";lev
200 IF lev<1 OR lev>90THEN GO TO 180
210 PRINT" Compass ?"
220 comp$=INKEY$(-1)
230 IF comp$<>"y"AND comp$<>"n"THEN GO TO 220
240 lev=lev+9:sc=lev*15
250 IF comp$="y"THEN sc=sc-100
260 p$=""
270 CLS
280 PRINT"            Please wait"
290 CLS #0:PAPER #0,0
300 DIM maze(lev,lev)
310 ju=1
320 rande=RND(1TO 4)
330 IF rande=1 THEN am=1:an=0
340 IF rande=2 THEN am=-1:an=0
350 IF rande=3 THEN am=0:an=-1
360 IF rande=4 THEN am=0:an=1
370 aw$=DATE$:ar=aw$(16 TO 17):es=aw$(19 TO 20):eg=(ar*60)+es
380 FOR lq=0 TO lev:FOR qi=0 TO lev:maze(qi,lq)=1:NEXT qi:NEXT lq
390 FOR ek=0 TO lev*(lev-(.2*lev))
400 lz=RND(1 TO lev-1)
410 ly=RND(1 TO lev-1)
420 IF maze(lz,ly)=0THEN GO TO 400
430 IF (maze(lz-1,ly-1)=1OR maze(lz,ly-1)=1 OR maze(lz-1,ly)=1) AND (maze(lz+1,ly-1)=1OR maze(lz,ly-1)=1OR maze(lz+1,ly)=1)AND (maze(lz-1,ly+1)=1OR maze(lz-1,ly)=1OR maze(lz,ly+1)=1)AND (maze(lz+1,ly+1)=1OR maze(lz+1,ly)=1OR maze(lz,ly+1)=1)THEN maze(lz,ly)=0
440 NEXT ek
450 i=RND(1 TO lev-1):j=RND(1 TO lev-1):IF maze(i,j)=1THEN GO TO 450
460 dd=RND(0 TO lev):cc=0:hh=-1:ii=0
470 IF maze(cc+1,dd)=1THEN GO TO 460
480 CLS:FILL 1
490 INK 5
500 LINE 0,0TO 10,14TO 136,14TO 146,0TO 0,0
510 IF i+an=cc AND j-am=dd THEN INK 0:ag:GO TO 540
520 IF i+an>lev OR i+an<0 OR j-am>lev OR j-am<0 THEN INK ju:ag:GO TO 540
530 IF maze(i+an,j-am)=1THEN INK ju:ag:ELSE af
540 IF i-an=cc AND j+am=dd THEN INK 0:al:GO TO 570
550 IF i-an<0OR i-an>lev OR j+am>lev OR j+am<0THEN INK ju:al:GO TO 570
560 IF maze(i-an,j+am)=1THEN INK ju:al:ELSE ah
570 FOR w=0 TO 5
580 tin
590 u=1/2 ai:w=w+1
600 IF i+(w*am)=cc AND j+(w*an)=dd AND am=hh AND an=ii THEN INK 0:a(u):g=4:GO TO 730
610 IF i+(am*w)>lev OR i+(an*w)>lev OR i+(am*w)<0OR i+(an*w)<0THEN INK 3-ju:a(u):g=4:GO TO 730
620 IF maze(i+(am*w),j+(an*w))=1THEN INK 3-ju:a(u):g=4:GO TO 730
630 a u
640 IF i+((ar+am)*((w*an*am)+(an*an)))=cc AND j+((an-am)*((w*an*an)+(an*am)))=dd THEN INK 0:c(u):GO TO 670
650 IF i+((ar+am)*((w*an*am)+(an*an)))>lev OR
```

```
j+((an-am)*((w*an*an)+(am*am))))>lev OR j+((a
n+am)*((w*an*an)+(an*an)))<0 OR i+((an-am)*((
w*an*an)+(am*am)))<0THEN INK jus(u):GO TO 67
0
660 IF maze(j+((an*am)*((w*an*am)+(an*an))),i
+((an-am)*((w*an*an)+(am*am))))=1THEN INK jus
c(u):ELSE c(u)
670 IF j+((an am)*((w*am*am)+(an*an)))=cc AND
 i+((an+am)*((w*an*an)+(am*am)))=dd THEN INK
0:e(u) GO TO 720
680 IF j+((am-an)*((w*am*am)+(an*an)))>lev OR
 i+((an+am)*((w*an*an)+(am*an)))>lev OR j+((a
m-an)*((w*am*an)+(an*an)))<0 OR i+((an+am)*((
w*an*an)+(am*am)))<0 THEN INK jus(u):GO TO 7
00
690 IF maze(j+((am-an)*((w*an*am)+(an*an))),i
+((an+am)*((w*an*an)+(am*am))))=1THEN INK jus
e(u):ELSE f(u)
700 IF j+((am+an)*5) 0 OR j+((am+an)*5)>lev T
HEN GO TO 720
710 IF g=5 AND maze(j+((am+an)*5))=1THEN cr
oss
720 NEXT a
730 a$=INKEY$(50)
740 tim
750 IF a$<>"f"AND a$<>"l"AND a$<>"r"AND a$<>"
a"AND a$<>"m"THEN GO TO 730
760 IF a$="m"THEN displaymaze:GO TO 480
770 IF a$="l"THEN ee=am:ff=an:am-(ee*ff)+ff:a
n=(ee*ff)-ee:iu=3-iu:GO TO 480
780 IF a$="r"THEN ee=an:ff=an:am=(ee*ff)-ff:a
n=(ee*ff)+ee:iu=3-iu:GO TO 480
790 IF a$="a"THEN am=-am:an=-an:GO TO 480
800 IF a$<>"f"THEN GO TO 730
810 IF j+am=cc AND i+an=dd THEN finish
820 IF j+an>lev OR j+am<0 OR i+an>lev OR i+an
<0 THEN GO TO 730
830 IF maze(j+am,i+an)=1THEN GO TO 730
840 j=j+am:i=i+an:GO TO 480
850 DEFine PROCedure af
860 FILL 1
870 INK 3-iu
880 LINE 0,14 TO 0,100 TO 10,100 TO 10,14 TO
0,14
890 FILL 1
900 INK 5
910 LINE 0,14 TO 11,14 TO 0,0 TO 0,14
920 END DEFine
930 DEFine PROCedure ab
940 FILL 1
950 LINE 0,0 TO 10,14 TO 10,100 TO 0,100 TO 0
,0
960 END DEFine
970 DEFine PROCedure ah
980 FILL 1
990 INK 3-iu
1000 LINE 136,14 TO 136,100 TO 146,100 TO 146
,14 TO 136,14
1010 FILL 1
1020 INK 5
1030 LINE 136,14 TO 146,14 TO 146,0 TO 136,14
1040 END DEFine
1050 DEFine PROCedure ai
1060 FILL 1
1070 LINE 136,14 TO 136,100 TO 146,100 TO 146
,0 TO 136,14
1080 END DEFine
1090 DEFine PROCedure a(size)
1100 FILL 1
1110 LINE 73-(size*63),100-(size*86)TO 73+(si
ze*63),100-(size*86)TO 73+(size*63),100 TO 73
-(size*63),100 TO 73-(size*63),100-(size*86)
1120 END DEFine
1130 DEFine PROCedure b(size)
1140 INK 5
1150 FILL 1
1160 LINE 73-(size*63),100-(size*86)TO 73-(si
ze*31.5),100-(size*43)TO 73+(size*31.5),100-(
size*43)TO 73+(size*63),100-(size*86)
1170 END DEFine
1180 DEFine PROCedure c(size)
1190 FILL 1
1200 LINE 73-(size*63),100-(size*86)TO 73-(si
ze*63),100TO 73-(size*31.5),100 TO 73-(size*3
1.5),100-(size*43)TO 73-(size*63),100-(size*8
6)
1210 END DEFine
1220 DEFine PROCedure d(size)
1230 FILL 1
1240 INK 5
1250 LINE 73-(size*63),100-(size*86)TO 73-(si
ze*63),100-(size*43)TO 73-(size*31.5),100-(si
ze*43)TO 73-(size*63),100-(size*86)
1260 FILL 1
1270 INK 3-iu
1280 LINE 73-(size*63),100-(size*43)TO 73-(si
ze*31.5),100-(size*43) TO 73-(size*31.5),100T
O 73-(size*63),100TO 73-(size*63),100-(size*4
3)
1290 END DEFine
1300 DEFine PROCedure e(size)
1310 FILL 1
1320 LINE [illegible] (size*86)TO [illegible](si
ze*6[illegible]),1[illegible]TO 73+(size*[illegible]),100 TO 73 [illegible](size*3
1.5),100-(size*43)TO [illegible](size*63),1[illegible](size*8
6)
1330 END DEFine
1340 DEFine PROCedure f(size)
1350 FILL 1
1360 INK 5
1370 LINE 73+(size*63),1[illegible]-(size*86)TO 73+(si
ze*63),100-(size*43)TO 73+(size*31.5),100-(si
ze*43)TO 73+(size*63),100-(size*86)
1380 INK 3-iu
1390 LINE 73+(size*63),1[illegible](size*43 TO 73+(si
ze*31.5),100-(size*43)TO 73+(size*31.5),100TO
 73+(size*63),100TO 73+(size*63) 100-(size*43
)
1400 END DEFine
1410 DEFine PROCedure cross
1420 FILL 1:INK 3:LINE [illegible] TO 73,100 TO 7[illegible]
97 TO 71,97:FILL 1:INK 2:LINE 71,97 TO 71,10[illegible]
[illegible] FILL 1:LINE 7[illegible] TO 75
[illegible] TO 7[illegible],100 TO [illegible]
1430 END DEFine
1440 DEFine PROCedure tim
1450 [illegible]
1460 [illegible] TO [illegible]
1470 [illegible]
1480 IF [illegible] THEN [illegible]
1490 [illegible]PRINT #0;"Time: ";((lev*25)-eg*
eg) DIV 60;":";((lev*25)-eg*eg) MOD 60;"
[illegible]"
1500 IF [illegible] THEN [illegible]
1510 END DEFine
1520 DEFine PROCedure finish
1530 CLS
1540 CSIZE 3,1
1550 INK [illegible]
1560 CLS #0
1570 PRINT\\"          W E L L";[illegible]
1580 PRINT"          D O N E"
1590 BEEP [illegible]
1600 CSIZE 2,0
1610 PRINT\\\\\\"  It took you ";time-ee DIV 6
0;" minutes ";time-ee MOD 60;" seconds.
1620 [illegible]
1630 PRINT\\"  You score  [illegible]
1640 CSIZE [illegible]:PRINT\\"  Press a key to play a
gain  PAUSE:CSIZE [illegible]:RUN
1650 DEFine PROCedure [illegible]
1660 CLS
1670 CSIZE 3,1
1680 PRINT\\"          H A R D  [illegible]
1690 PRINT"          L U C K"
1700 BEEP 150[illegible]
1710 PRINT\\\\\\"  Press a key to play again
" PAUSE:CSIZE [illegible]:RUN
1720 DEFine PROCedure displaymaze
1730 [illegible]
1740 INK 4
1750 CLS:CLS#0
1760 IF [illegible] THEN [illegible]
[illegible]
1770 IF [illegible] THEN [illegible]:ELSE IF [illegible] THEN
[illegible]:ELSE [illegible]
1780 IF [illegible] THEN [illegible]:ELSE IF [illegible]THEN [illegible]
[illegible]:ELSE [illegible]
1790 IF [illegible]THEN [illegible]
1800 IF [illegible] THEN [illegible]
1810 FOR [illegible] TO [illegible]
1820 FOR [illegible] TO [illegible]
1830 IF [illegible] THEN PRINT;"E";:GO TO
18[illegible]
1840 IF [illegible] THEN [illegible]:GO TO 18[illegible]
1850 IF maze([illegible]) THEN PRINT;[illegible]:ELSE PR
INT;[illegible]
1860 NEXT [illegible]
1870 PRINT
1880 NEXT [illegible]
1890 [illegible]
1900 END DEFine
1910 DEFine [illegible]
1920 [illegible]
1930 IF [illegible] THEN [illegible]
1940 [illegible] THEN [illegible]
1950 [illegible]
1960 IF [illegible] THEN PRINT [illegible]
1970 [illegible]
1980 END DEFine
1990 DEFine PROCedure [illegible]
2000 [illegible]
2010 IF [illegible] AND [illegible] THEN [illegible] GO TO [illegible]
2020 IF i=dd AND am=1THEN p$= [illegible] GO TO 2070
2030 IF i=dd AND an=1THEN p$= [illegible] GO TO [illegible]
2040 IF i=dd AND an= [illegible] THEN p$= [illegible] GO TO 2070
2050 IF [illegible] cc AND am=1 OR [illegible] cc AND am= [illegible]
[illegible] dd AND an=[illegible] dd AND an= [illegible]THEN p$= [illegible]
:ELSE p$=
2060 IF [illegible] cc AND an=1) OR [illegible] cc AND an=-1) O
R [illegible] dd AND am=1) OR [illegible] dd AND am=-1)THEN p$=p
[illegible]:ELSE p$=p[illegible]
2070 END DEFine
```

# Invisible colours

*An interesting interrupt driven m/c program for the CBM 64 by* ***Mark Gornall***

This program is best described as a transparent colour changer, because once the program has been run you would not know that it's there unless you press *F1*, *F3* or *F5*. It is transparent so that it can be used in conjunction with nearly all Basic programs and many machine code programs.

Once you have run the Basic program you can *New* it and load in another program. Once another program has loaded you will find that Colour Changer will continue to work, unless Run/Stop and Restore are pressed, in which case you will have to type *Sys49152* to start it again. Of course you don't have to load a program once Colour Changer is running, you could start programming from scratch.

The main use of the program, I would hope, would be for people to include the small Basic program at the beginning of their own programs, so that when their program is running the user will be able to change all the screen colours with the greatest of ease without affecting anything else that the computer may be doing.

Entirely interrupt driven, the assembly listing shows that the program is made up of two main parts. The first part, Lines 190-250, tell the computer where about in memory to jump to every 60th of a second, from Lines 200 and 220 we see that this address if *$COOD*. Once the computer knows where the beginning of the interrupt routine is, ie, *$COOD*, it starts the interrupts running and then returns to basic.

The second part of the program, ie, 310-710 is what the computer runs through every time an interrupt occurs. First of all the program ckecks to see if either *F1*, *F3* or *F5* have been pressed. If none of these keys has been pressed the computer continues with what it was doing before it was interrupted. If, however, one of these keys has been pressed the program will change the colour of the border, screen or text as appropriate to the key pressed. Once the colour has been changed the computer continues with what it was doing by means of a *JMP $EA31*.

If you wish to use this program in conjunction with a machine code program of your own, I suggest storing the values of the registers on the stack at the beginning of the interrupt routine and retrieving them at the end.

KEYS

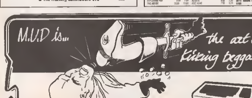
*F1* – Change Border Colour, *F5* – Change Screen Colour, *F5* – Change Text

```
100 REM *** COLOUR CHANGE-MARK G;1985 ***
110 J=0:FORI=0TO77
120 READA:POKE49152+I,A
130 J=J+A
140 NEXTI
150 IFJ<>10409THENPRINT"SUM ERROR":END
160 SYS49152
170 DATA 120,169,13,141,20,3,169,192,141
180 DATA 21,3,88,96,165,197,201
190 DATA 4,240,11,201,5,240,17,201,6,240
200 DATA 23,76,49,234,174,32
210 DATA 208,232,142,32,208,76,49,234
220 DATA 174,33,208,232,142,33,208,76
230 DATA 49,234,174,134,2,232,142,134,2
240 DATA 138,160,0,153,0,216,153
250 DATA 255,216,153,254,217,153,233
260 DATA 218,200,208,241,76,49,234
```

```
100 ' *************************
110 ' ***** COLOUR   CHANGE *****
120 ' ***** BY MARK GORNALL *****
130 ' *************************
140 '
150 '
160 '
170 ' ----- START INTERRUPTS -----
175 '
180 *=$C000
190          SEI
200          LDA £$DD            'LSB INTERRUPT START ADDRESS
210          STA $0314
220          LDA £$C0            'MSB INTERRUPT START ADDRESS
230          STA $0315
240          CLI
250          RTS                 'RETURN TO BASIC
260 '
270 '
280 '
290 ' ----- INTERRUPT ROUTINE -----
300 '
310          LDA $C5             'WHAT KEY WAS PRESSED?
320          CMP £$04            'WAS IT F1?
330          BEQ BORDER
340          CMP £$05            'WAS IT F3?
350          BEQ SCREEN
360          CMP £$06            'WAS IT F5?
370          BEQ TEXT
380          JMP $EA31           ' INTERRUPT COMPLETE
390
```

```
400 !
410 ! ---- CHANGE BORDER -----
420 !
430 BORDER      LDX $D020          !GET PRESENT BORDER COLOUR
450             INX                !INCREASE IT BY ONE
460             STX $D020          !CHANGE BORDER TO NEW COLOUR
470             JMP $EA31          !INTERRUPT COMPLETE
480 !
490 !
500 ! ----- CHANGE SCREEN -----
510 !
520 SCREEN      LDX $D021          !GET PRESENT SCREEN COLOUR
530             INX                !INCREASE IT BY ONE
540             STX $D021          !CHANGE SCREEN TO NEW COLOUR
550             JMP $EA31          !INTERRUPT COMPLETE
560 !
570 !
580 ! ---- CHANGE TEXT -----
590 !
600 TEXT        LDX $0286          !GET PRESENT TEXT COLOUR
610             INX                !INCREASE IT BY ONE
620             STX $0286          !STORE NEW TEXT COLOUR
630             TXA                !TRANSFER X TO A
640             LDY #$00
650 LOOP        STA $D800,Y        !CHANGE
660             STA $D8FF,Y        !TEXT
670             STA $D9FE,Y        !ALREADY
680             STA $DAE9,Y        !ON SCREEN
690             INY
700             BNE LOOP
710             JMP $EA31          !INTERRUPT COMPLETE
```






British Telecommunications plc.

# Expand and compress

*Now you've compressed that text – expand it! **Jeff Tullin** shows how*

If you have followed the series over the last few weeks you now have a program which squashes text and stores it away in memory, creating a database for use by this week's program.

The basic format of the database so created is this

1) One byte (*Chr$13*) denoting start of dictionary list

2) Up to 119 keywords, terminated each time by one byte (*Chr$13*)

3) One byte (*Chr$13*) to signify beginning of text area

4) Up to 255 text items, terminated by a (*Chr$13*) each time

5) An end of list marker (*Chr$255*)

More sections of text can be added after this, so long as they obey the rules from numbers three to five above

Last week's flowcharts explain, (I hope) better than words can, how the expander routine works. Certainly the routine is easy to use: run the program, and this creates the machine code from &7800 onwards (line 250) line 220 holds the address of the dictionary as given at the end of *Compactor*

To use the routine, **load* the database into &5200, or run *Compacter* and type *New*. Then, what *Expander* expects is the address of your text list entered into *Y%*, and the number of the text item you want printed entered into *X%*, followed by *Call &7800*.

With the squashed text resident in memory, and the machine code assembled at &7800, type

*Y% = &524C: X% = 2: Call&7800*

(Where *&524C* is the address of the text as given at the end of the *Compactor* program.) The second *Data* item should be printed out in full. If not, check the assembly language program carefully. If all goes well, then try *X% = 10: Call&7800* to check the error trapping out. You should find this method of text retrieval very simple to use from Basic or machine code program.

**Conversion Hints**

1) The address of the text, passed in *Y%* on the BBC is picked up from locations *&404* and *&405* which is the BBC's internal memory allocation for *Y%*.

2) The *X* register is automatically set to the low byte of *X%* by the BBC operating system, when the command *Call* is issued. This is not so of other micros to my knowledge.

3) The ten zero page locations *ZP1* to *ZP11* should be consecutive as some are used as 16-bit numbers. If ten locations are not normally free, try saving their values on the stack, then restoring them afterwards.

4) The BBC will print the string terminated by a zero byte, which follows a *Brk* instruction. Replace Line 1380 by *Rts*.

Finally, if the prospect of typing in the programs seems a little too much effort, you may send a cheque/P O for £3.00, together with a blank tape or disc and an sae to me at 22 Kings Close, Gateshead, NE8 3PU, and I will return a working copy to you. Please state Basic1 or Basic2.

```
10 REM EXPANDER PROGRAM
20 REM (C) 1985 Jeff Tullin
30 REM BBC MICRO any OS
40
50 REM Will work on quite a few
   other 6502 machines,as long
   as machine specific addresses
   are allowed for.
60 REM MACHINE SPECIFIC CALLS.
   &FFE7 causes newline and CR,
   &FFEE prints character in
   accumulator, leaves registers
    intact.
70 REM zp1 - zp11 are zero page
   locs. available to the user.
80 zp1=&70
90 zp2=&71
100 stringno=&72
110 zp4=&73
120 zp5=&74
130 zp6=&75
140 capitalflag=&76
150 zp8=&77
160 zp9=&78
170 zp10=&79
180 zp11=&7A
190
200 newline=&FFE7
210 HIMEM=&5200
220 dictionary=&5200
230
240 FOR OP = 0 TO 2 STEP 2
250 P%=&7800
260 [OPT OP
270 .expand
280 \
290 \   ON ENTRY, Y% HOLDS ADDRESS
300 \   OF LIST & X% HOLDS NUMBER
310 \   OF REQUIRED STRING
320 \
330 STX stringno
340 LDA #1
350 STA capitalflag
360 LDA &405:PHA
370 LDA &404:PHA
    \ Pick up addresses from Y%
380 JSR locate_string
    \ and find address of string
390
400 PLA:STA zp8
410 PLA:STA zp9
420
430 LDY #0
440 .mainloop
450 LDA (zp8),Y
 \ examine one character of string
460 CMP #13
470 BEQ exit
    \ Branch if string finished
480 CMP #ASC"."
490 BNE fullstop
500 JSR newline
    \ ...
510 INY
520 CLC:BCC mainloop
530
540 .fullstop
550 CMP #46
560 BNE token_handler
570 JSR outputchar
    \ Print full stop
580 JSR newline
    \ Followed by newline
590 LDA #1
600 STA capitalflag
 \ Ensure next letter is capital
610 INY
620 CLC:BCC mainloop
630
640 .token_handler
650 CLC
660 CMP #130
670 BCS tokenfound
 \ Branch if CHR$> 130 (IE token)
680 JSR outputchar
    \ Otherwise print as normal
690 INY
700 CLC:BCC mainloop
710 :
720 .tokenfound
730 SEC
740 SBC #130
 \ Reduce A by 130 =TOKEN NUMBER
750 STA stringno
760 LDA #dictionary DIV 256:PHA
770 LDA #dictionary MOD 256:PHA
780 STY zp6
790 JSR locate_string
 \ Find address of token required
800 PLA:STA zp10
810 PLA:STA zp11
820 JSR printstring
    \ Print it out
830 LDY zp6
840 INY
850 CLC:BCC mainloop
860
 870
 880 .exit RTS
 890
 900
 910 .locate_string
 920 \
 930 \ FINDS THE ADDRESS OF THE
 940 \ REQUIRED STRING AND LEAVES
 950 \ IT ON THE STACK
 960 \
 970
 980
 990 PLA
1000 STA zp1
1010 PLA
1020 STA zp2
    \ Store return address
1030 PLA
1040 STA zp4
```

```
1050 PLA
1060 STA zp5
     \ Store working address
1070 LDA #0:TAX
1080 LDY #0
1090 .loop
1100 LDA (zp4),Y
1110 CMP #&0D
1120 BEQ endofstring
1130 CMP #&FF
1140 BEQ out_of_range
     \ End of list reached.
1150 .keep_looking
1160 JSR incrementbase
1170 JMP loop
1180 .endofstring
1190 INX
1200 CPX stringno
1210 BNE keep_looking
1220 JSR incrementbase
1230 LDA zp5:PHA:LDA zp4:PHA
1240 LDA zp2:PHA:LDA zp1:PHA
     \ Restore return address.
1250 RTS
1260
1270 .out_of_range
1280 BRK:BRK:EQUS Parameter
     error :BRK
1290
1300 .incrementbase
1310 \
1320 \ ADDS 1 TO WORKING ADDRESSES
1330 \ USED BY locate_string
1340 \
1350 INC zp4
1360 LDA zp4
1370 CMP #0
1380 BNE carryclear
1390 INC zp5
1400 .carryclear
1410 CLC
1420 RTS
1430
1440 .printstring
1450 \
1460 \ PRINTS OUT STRING AT ADDRESS
1470 \ HELD AT LOCATION zp10/ zp11
1480 \
1490 LDY #0
1500 .lupe
1510 LDA (zp10),Y
1520 CMP #13
1530 BEQ endofline
1540 JSR outputchar
1550 INY
1560 JMP lupe
1570 .endofline
1580 RTS
1590
1600
1610 \ DEALS WITH THE ACTUAL
     PRINTING
1620 \ TO THE SCREEN AS REGARDS
1630 \ MAKING 1st LETTER OF PHRASE
1640 \ INTO A CAPITAL LETTER
1650 \
1660
1670 .outputchar
1680 PHA
1690 CLC
1700 LDA capitalflag
1710 BEQ print
\ Branch if capitals not required
1720 PLA
1730 PHA
1740 CMP #123
1750 BCS print
1760 CMP #96
1770 BMI print
1780 PLA
1790 SEC
1800 SBC #32
\ Forces capital on valid character
1810 PHA
1820 LDA #0
1830 STA capitalflag
     \ Clear flag to prevent all
     capitals
1840 .print
1850 PLA
1860 JSR &FFEE
1870 RTS
1880
1890 ]
1900 NEXT
1910 PRINT"INSTRUCTIONS FOR USE.
     *LOAD dictionary + squashed
text          THEN CALL THE ROUTINE.
              Format:
     Y%=<address>:X%=<message no.
>:CALL &7000
```

# Building a Basic extension

*Part Three of the ZX!Basic code this week – by*
**Stuart Nicholls**

Lots of code to type in this week – most of Part Two in fact. Use the Hexloader printed in Vol 4 No 31 and you won't go far wrong.

Should you get spots before the eyes I can supply copies of ZX!Basic on tape for £3.00.

Write to me at 82 Lays Drive, Keynsham, Bristol, BS18 2LE.

The remainder of the listing will be printed in the last part of the series next week.

```
ZX Spectrum 48K HEXDUMP
Part 2 : CODE 59904,5466
EA00  FC 00 F8 03 E0 0E C0 1D = DD
EA08  80 3B 00 3B 00 73 00 73 = 5C
EA10  3F 00 0F C0 07 F0 03 F8 = 00
EA18  01 FC 01 FC 00 FE 00 FE = F6
EA20  80 73 80 73 00 3B C0 3B = 9C
EA28  C0 1D E0 0F F0 03 FC 06 = DD
EA30  00 FE 00 FE 01 FC 01 FC = F6
EA38  03 F8 07 F0 0F C0 3F 00 = 00
EA40  FE 00 00 01 00 7E 00 0F = BC
EA48  F0 01 FC 01 F0 01 E0 0E = CD
EA50  7F 00 01 00 04 7E 01 F0 = 8F
EA58  0F 80 3F 80 0F 80 07 78 = 04
EA60  C0 15 00 2A 80 55 00 40 = 14
EA68  00 7F 54 24 C3 18 E7 00 = ED
EA70  03 46 01 54 00 4A 00 03 = AC
EA78  00 FE 01 24 C3 18 E7 00 = E5
EA80  FE 00 E0 0F E0 00 00 00 = 4F
EA88  80 7F 00 28 80 7F 00 52 = F0
EA90  0F 00 07 F0 27 18 01 1D = EE
EA98  80 FE 01 04 00 FE 00 4A = 45
EAA0  00 2C 00 40 00 42 00 28 = 63
EAA8  00 27 00 20 C0 1F E0 00 = 06
EAB0  01 34 00 32 00 42 01 14 = 38
EAB8  01 E4 01 04 03 F8 07 00 = EC
EAC0  FF 00 FF 00 FF 00 FC 00 = F9
EAC8  F8 03 F0 04 F1 04 01 04 = 79
EAD0  FF 00 FF 00 FF 00 1F 00 = 1C
EAD8  0E E0 07 18 C7 18 C7 18 = 04
EAE0  00 44 00 7F 00 42 00 5A = 7F
EAE8  00 67 00 24 C3 18 E7 06 = CD
EAF0  03 38 01 FC 00 42 00 5A = D4
EAF8  00 E6 01 24 C3 18 E7 00 = CD
EB00  FF 00 FF 00 FE 00 FC 01 = F9
EB08  F8 01 E0 07 C0 1F 00 3B = 77
EB10  F8 00 01 04 00 FA 01 F0 = F3
EB18  03 F0 03 F0 07 F0 07 F0 = E4
EB20  06 73 00 67 00 6F 00 67 = A8
EB28  00 7F 00 3F C0 1F E0 00 = FD
EB30  07 F0 07 F0 07 F0 07 F0 = DC
EB38  07 F0 0F E0 1F C0 3F 00 = 04
EB40  F6 00 E0 0E C0 1C C0 1F = F6
EB48  00 3F 00 6A 00 55 00 2A = 1E
EB50  3B 00 01 C4 00 FE 01 00 = 7F
EB58  0E E0 01 5B 00 4E 01 06 = F7
EB60  C0 1F 00 2A 00 55 00 47 = 1F
EB68  00 55 00 23 C0 1F E0 00 = 07
EB70  03 FB 01 44 00 46 00 93 = 70
EB78  00 AA 01 C4 03 F8 07 00 = 71
EB80  FE 00 FC 01 FC 01 F8 03 = F3
EB88  F8 02 F8 07 F8 06 E0 06 = 06
EB90  7F 00 5F 00 5F 00 1F 40 = 9C
EB98  1F 40 0E 20 0E 00 07 10 = 06
EBA0  E0 0E C0 1D C0 1A 00 3B = 62
EBA8  00 3A C0 1D E0 07 F8 00 = 76
EBB0  07 50 03 00 03 40 01 04 = 03
EBB8  01 44 03 18 07 E0 1F 00 = 66
EBC0  FE 00 E0 01 C0 1F C0 10 = 0E
EBC8  C0 16 C0 16 C0 16 C0 16 = 5B
EBD0  7F 00 07 60 03 F0 03 00 = 0C
EBD8  03 68 03 60 03 A8 03 A8 = AC
EBE0  C0 18 C0 16 C0 16 C0 19 = 40
EBE8  C0 16 C0 16 C0 1F E0 00 = 6D
EBF0  03 00 03 A0 03 00 03 00 = EC
EBF8  03 A0 03 60 03 F0 07 00 = 08
EC00  F8 00 F0 04 F0 04 E0 0E = 04
EC08  C0 00 C0 12 80 3A 04 41 = 9C
EC10  4F 00 07 10 0E C0 0F C0 = A4
EC18  07 30 0F 80 05 80 00 46 = 35
EC20  00 5A 00 4A 00 7A 00 25 = C3
EC28  00 24 00 3B 00 25 00 25 = 46
EC30  00 AA 00 AE 00 6A 03 58 = 17
EC38  07 58 07 58 07 58 07 58 = 5C
EC40  F0 00 F0 07 E0 00 C0 1B = A7
EC48  00 2B 00 5B 00 4B 00 27 = DF
EC50  1F 0B 0E E0 07 18 03 00 = 30
EC58  01 04 00 04 00 12 01 E4 = 04
EC60  00 2C C0 12 C0 12 E0 09 = 37
EC68  E0 00 F8 03 F0 07 F8 00 = CD
EC70  01 34 03 40 03 4B 07 90 = 62
EC78  07 90 0F 4B 0F E0 1F 00 = 96
EC80  FC 00 E0 03 C0 1F 00 3C = 7A
EC88  00 7E 00 76 00 7E 00 7C = E2
EC90  7F 00 07 A0 03 F8 01 FC = FE
EC98  00 FA 00 FA 00 FA 00 FA = 00
ECA0  00 6F 00 CF 00 4B 00 4B = D4
ECA8  00 69 00 00 E0 00 F4 00 = 05
ECB0  01 FC 01 FC 01 EC 01 2C = 14
ECB8  01 2C 01 2C 01 2C 03 00 = 5A
ECC0  FE 00 F0 01 E0 06 00 18 = 73
ECC8  00 6D 00 2B 00 7E 00 7F = 39
ECD0  7F 00 1F 00 07 60 01 18 = 95
ECD8  00 06 00 1A 00 76 00 AA = 40
ECE0  00 7F 00 7F 00 7F 00 7F = FC
ECE8  00 1F E0 07 F8 01 FE 00 = 70
ECF0  00 50 00 AA 00 54 00 AE = 04
ECF8  01 50 07 E0 1F 58 7F 00 = 5E
ED00  00 00 00 7F 00 60 00 4E = AD
ED08  00 42 00 44 00 4E 00 60 = 34
ED10  01 00 00 FE 00 04 00 92 = 97
ED18  00 42 00 62 00 92 00 06 = 5C
ED20  00 7F 00 6B 00 7F 00 10 = F9
ED28  C7 10 0E 20 07 70 0F 00 = 8C
ED30  00 FE 00 00 00 FE 01 00 = 00
ED38  E3 00 F1 04 E0 0E F1 00 = 0F
ED40  F0 00 C0 04 00 32 00 00 = FE
ED48  00 67 00 1F 00 6F 00 19 = 0E
ED50  0F 00 00 90 00 A2 01 CC = 73
ED58  00 82 01 EC 03 F0 01 3C = CF
ED60  06 4E 00 18 C0 25 00 0C = 5D
ED68  00 5F 00 22 01 04 F8 00 = 01
ED70  01 E4 00 0A 01 38 01 64 = 2B
ED78  00 CA 01 40 07 20 0E 00 = 07
ED80  F0 00 F0 07 E0 0F E0 0E = CD
ED88  C0 1F C0 10 C0 15 00 31 = 35
ED90  3F 00 1F C0 0F E0 07 F0 = 04
ED98  07 F0 03 20 03 58 01 1C = 6A
EDA0  00 3F 00 3F 00 7F 00 7F = 7C
EDA8  00 7F 00 7F 00 63 9C 00 = FE
EDB0  01 FC 01 FC 00 FE 00 FE = F8
EDB8  00 9E 00 CE 31 00 7F 00 = FC
EDC0  F0 00 E0 0F C0 1F 00 3F = 70
EDC8  00 72 00 1D C0 0F 00 0F = 0D
EDD0  7F 00 1F 00 07 E0 10 C6 = 00
EDD8  11 44 31 04 11 C4 00 0A = 69
EDE0  C0 17 00 2F 00 7F C0 18 = 0A
EDE8  C0 0C 00 3D 00 35 CA 00 = 00
EDF0  01 0C 00 EA 01 E4 11 C4 = 01
EDF8  01 CC 01 EC 01 0C 93 00 = 0A
EE00  01 00 00 00 0C 01 00 01 = 0F
EE08  01 00 00 00 0C 05 00 03 = 14
EE10  01 00 00 00 0C 09 00 03 = 19
EE18  01 00 00 00 0C 06 06 04 = 1E
EE20  01 00 00 00 0C 11 00 05 = 23
EE28  01 00 00 00 0C 15 00 06 = 28
EE30  01 00 00 00 0C 19 00 07 = 2D
EE38  01 00 00 00 0C 1D 00 00 = 32
EE40  01 00 00 00 12 01 00 00 = 1D
EE48  01 04 00 00 12 05 00 0A = 22
EE50  01 00 00 00 12 09 00 0B = 27
EE58  01 04 00 00 12 0D 00 0C = 2C
EE60  01 04 00 00 12 11 00 0D = 31
EE68  01 06 00 00 12 15 00 0E = 36
EE70  01 00 00 00 12 19 00 0E = 3B
EE78  01 00 00 00 12 1D 00 10 = 40
EE80  00 00 00 00 0C 00 00 00 = 0C
EE88  00 00 00 00 0C 00 00 00 = 0C
EE90  00 00 00 00 0C 00 00 00 = 0C
EE98  00 00 00 00 0C 00 00 00 = 0C
EEA0  00 00 00 00 00 00 00 00 = 00
EEA8  00 00 00 00 00 00 00 06 = 06
EEB0  00 00 00 00 00 00 00 00 = 00
EEB8  00 00 00 00 00 00 00 00 = 00
EEC0  00 00 00 00 00 00 00 00 = 00
EEC8  00 00 00 00 00 00 00 00 = 00
EED0  00 00 00 00 00 00 04 00 = 00
EED8  00 00 00 00 00 00 00 00 = 00
EEE0  00 00 00 00 00 00 00 00 = 00
EEE8  00 00 00 00 00 00 00 00 = 06
EEF0  00 00 00 00 00 00 00 00 = 06
EEF8  00 00 00 00 00 00 00 00 = 04
EF00  F3 F5 E5 05 C5 3A 2E EF = 06
EF08  3C C2 34 EF 32 2E EF 60 = 9C
EF10  18 11 98 F1 21 00 EE 7E = 5A
EF18  12 3E 00 05 6F 13 18 F7 = 66
EF20  21 00 40 11 00 02 01 00 = 45
EF28  18 ED 00 C3 5A EF 00 7E = 5A
EF30  0F 0E 0E 66 68 46 5F 79 = 73
EF38  E6 18 F6 40 57 C9 78 3C = 09
EF40  E6 1F 28 02 1C C9 78 E6 = 75
EF48  E0 0F C9 78 C6 20 5F 00 = 90
EF50  7A C6 00 57 FE 58 C0 16 = CB
EF58  40 C9 CD 11 F1 CD 5B F0 = F2
EF60  CB 79 EF CD 00 EF C0 3A = 0F
EF68  F1 C1 01 E1 F1 C3 38 0F = 50
EF70  21 00 EE 11 00 F1 D5 E5 = 06
EF78  CD 07 EF E1 01 13 3E 00 = 4E
EF80  00 6F FE 00 20 F0 C9 1A = 65
EF88  06 C0 7E 12 23 A7 20 0D = 05
EF90  3A 78 5C A6 C0 23 72 23 = 30
EF98  06 20 03 1A A7 C0 23 42 = C8
EFA0  23 46 C0 2F EF 21 00 93 = 07
EFA8  19 0E 05 05 06 00 05 7E = 63
EFB0  12 14 24 10 FA D1 C0 39 = 2B
EFB8  39 09 CD 5E 0E 21 00 93 = E6
EFC0  19 10 C9 D1 79 A7 C0 CD = A0
EFC8  48 EF 21 00 92 19 18 DB = F9
EFD0  21 00 EE 05 CD E1 EF E1 = 73
EFD8  3E 00 05 6E FE 00 20 F3 = C8
EFE0  C9 7E A7 C8 23 5A 7E 0C = E7
EFE8  A6 20 09 23 23 23 42 23 = 00
EFF0  46 18 06 CB 41 F0 77 C0 = A0
EFF8  55 F0 77 CB 2F EF 23 23 = ED
F000  7E 30 E6 0F 2C 01 46 00 = 2D
F008  21 C0 E7 0F 3D 20 FC 0E = 3A
F010  03 D5 06 00 D5 1A A6 23 = A0
F018  06 12 23 14 10 F7 01 C0 = A2
F020  39 30 0F CD 3E EF 10 EA = 56
F028  D1 79 A7 C0 CB 40 EF 18 = D8
F030  E0 79 0E 0F 0E 4F E6 E0 = 96
F038  A8 5F 79 E6 03 EE 30 57 = 06
F040  C9 23 54 5D 23 23 1A 06 = 03
F048  FE FF 20 02 3E 17 FE 18 = DA
F050  20 01 AF 4F C9 23 13 1A = 38
F058  06 E6 1F 47 C9 21 00 EE = AA
F060  ED CD 6E F0 E1 3E 00 05 = 0C
F068  6F FE 00 20 F3 C9 7E A7 = EB
F070  C8 23 3A 28 5C A6 C8 CD = 2C
F078  41 F0 C0 55 F0 CD 31 F0 = 31
```

```
F080 23 06 00 05 1A 00 28 01 = F7
F088 04 CD 36 EF 1A BE 28 04 = FA
F090 78 C6 03 47 01 78 C6 20 = 0A
F098 3F 38 00 14 7A FE 58 20 = 9E
F0A0 02 16 58 1A BE 20 04 78 = E4
F0A8 C6 05 47 CD 3C EF 1A BE = E4
F0B0 20 05 78 C6 02 47 78 47 = CF
F0B8 CB 20 2B 20 CB 46 20 47 = C9
F0C0 28 C8 46 20 49 23 FE 06 = D4
F0C8 20 3E FE 0A 20 3A FE 08 = D4
F0D0 20 38 FE 04 20 31 FE 0C = BD
F0D8 20 20 CD 5F 20 24 FE 01 = C2
F0E0 20 1A FE 03 20 10 FE 05 = 7E
F0E8 20 06 36 FF 20 36 FF C9 = 9C
F0F0 36 01 20 36 FF C9 36 FF = 95
F0F8 20 36 01 C9 36 01 20 38 = C3
F100 01 C9 7E EE FF 3C 77 20 = 13
F108 7E EE FF 3C 77 C9 23 10 = 22
F110 F7 21 7A EE 16 00 01 FE = 95
F118 EF ED 78 CB 5F 20 01 15 = 04
F120 CB 67 20 01 14 72 23 16 = 12
F128 00 CB 57 20 01 14 01 FE = 38
F130 F7 ED 78 CB 67 20 01 15 = C4
F138 72 C9 3A 78 EE A7 C8 ED = 37
F140 40 7C EE 79 3D FE FF 20 = 08
F148 02 3E 17 5F 78 3D E6 1F = 78
F150 57 21 00 EE E5 D5 CD 75 = A2
F158 F1 D1 E1 30 0C 78 C6 00 = 34
F160 6F FE 7C 20 EF 21 AC EE = AF
F168 36 00 C9 78 A7 1F 1F 1F = 08
F170 21 AC EE 77 C9 7E 47 C8 = E8
F178 23 23 23 23 0E 03 D5 04 = 78
F180 03 7E 23 DD 20 04 7E DA = 80
F188 20 15 20 14 7A E6 1F 57 = 52
F190 10 EF 01 00 C8 1C 7B FE = 3A
F198 10 28 E3 1E 00 10 DF 01 = D1
F1A0 37 C9 21 0C EF 36 FF 21 = 04
F1A8 00 EF 22 FF FE 3E FE ED = 37
F1B0 47 ED 5E C9 3E 3F ED 47 = 0C
F1B8 ED 56 C9 01 01 01 01 01 = 11
F1C0 01 01 01 01 01 01 01 01 = 08
F1C8 01 01 01 00 00 00 00 00 = 03
F1D0 00 00 00 00 00 00 00 00 = 00
F1D8 00 00 00 00 00 00 00 00 = 00
F1E0 00 00 00 00 00 00 00 00 = 00
F1E8 00 00 00 00 00 00 00 00 = 00
F1F0 00 00 00 00 00 00 00 00 = 00
F1F8 00 00 00 00 00 00 00 00 = 00
F200 C8 F5 F6 78 CD 2C F2 78 = 94
F208 CD 2C F2 ED 43 37 F2 CD = 11
F210 F5 F6 ED 43 35 F2 ED 43 = 72
F218 39 F2 C8 F1 78 78 B1 C8 = 48
F220 C0 1A 13 C5 D5 CD 3E F2 = 89
F228 D1 C1 10 F1 A7 28 03 FE = 68
F230 21 00 C3 F9 24 00 10 03 = AD
F238 01 00 10 26 00 6F 29 29 = 00
F240 29 ED 5B 36 5C 19 06 08 = 24
F248 C5 ED 4B 36 F2 7E E8 C5 = 4D
F250 06 08 C5 17 F5 38 10 ED = 1F
F258 4B 37 F2 C5 ED 4B 39 F2 = 9C
F260 C3 CD ED F6 CD 08 0E C1 = E9
F268 0C ED 43 39 F2 C1 10 E8 = 23
F270 10 14 ED 4B 37 F2 C8 ED = 41
F278 4B 39 F2 C5 CD 62 F6 C1 = A1
F280 0C ED 43 39 F2 C1 10 08 = 26
F288 F1 C1 10 C6 3A 39 F2 21 = 0A
F290 39 F2 77 23 35 C1 E1 10 = AC
F298 B4 23 C1 10 AB 3A 38 F2 = 87
F2A0 87 07 07 6F 3A 39 F2 B5 = 0E
F2A8 32 35 F2 32 39 F2 3A 36 = 28
F2B0 F2 32 3A F2 C9 00 00 C3 = 5C
F2B8 61 F5 FE C8 01 0E CD F8 = A3
F2C0 19 AF 32 47 5C 3D 32 3A = 46
F2C8 5C 10 01 E7 C0 0F 16 F8 = F8
F2D0 34 00 FA 0A 1C 0F 06 08 = C6
F2D8 FE 00 CA 92 F3 FE 3A 20 = 8A
F2E0 EA 21 49 F3 E5 4F E7 79 = D8
F2E8 F8 21 20 18 FE F4 20 09 = 02
F2F0 FE FA 20 05 FE EA C2 44 = 13
F2F8 10 D6 CE 4F 21 40 F4 09 = 74
F300 4E 09 10 13 DF 4F E7 79 = 18
F308 F2 58 D2 0A 1C D6 41 DA = C2
F310 0A 1C 10 E7 2A 74 5C 7E = 1D
F318 23 22 74 5C 01 14 F3 C5 = E2
F320 4F FE 20 30 10 A7 20 00 = 06
F328 21 39 F3 10 00 21 01 1C = A0
F330 06 00 09 4E 07 E3 0F 00 = 2F
F338 C9 0F C1 CD CD F3 E8 C3 = 84
F340 1A 1C 3F 09 C2 09 1C E7 = 19
F348 C9 CD 34 1F 30 02 CF 14 = 26
F350 C0 38 25 28 07 3A D1 F6 = 52
F358 A7 C4 60 F3 F0 C8 0A 7E = 88
F360 20 71 2A 42 5C C8 7C 20 = C8
F368 14 21 FE FF 22 45 5C 2A = 1F
F370 61 5C 2B ED 5B 59 5C 1B = 00
F378 3A 44 5C 18 33 CD 6E 19 = 79
F380 3A 44 5C 20 19 A7 20 43 = 25
F388 47 7E E6 C0 78 28 0F CF = 89
F390 FF C1 CD 30 25 C8 2A 55 = 29
F398 5C 3E C0 A6 C0 AF FE 01 = 6E
F3A0 CE 00 56 23 5E ED 03 45 = 2A
F3A8 5C 23 5E 23 56 EB 19 23 = 7D
F3B0 22 55 5C EB 22 5D 5C 57 = F0
F3B8 1E 00 FD 36 0A FF 15 FD = 6C
F3C0 72 0D CA C0 F2 14 CD 0D = 72
F3C8 19 28 06 CF 16 CD 30 25 = 50
F3D0 C0 C1 C1 0F FE 0D 20 5A = 0E
F3D8 FE 3A CA C0 F2 C3 8A 1C = 70
F3E0 2A 51 5C E5 3A 6A 5C F5 = 81
F3E8 2A 89 5C E5 2A 00 5C E5 = C2
F3F0 3E 03 CD 01 16 3E 16 D7 = 4F
F3F8 3E 15 D7 AF 07 38 58 D7 = 20
F400 ED 4B 48 5C CD 18 1A 3E = 19
F408 3A D7 ED 4B 47 5C 06 00 = F2
F410 CD 1B 1A 30 5D D7 06 05 = 7F
F418 38 20 07 10 F8 E1 22 00 = CB
F420 5C E1 22 04 5C F1 32 6A = CC
F428 5C E1 23 51 5C ED 4B BF = F4
F430 5C CD 3B 1F C9 C1 CB 30 = 0C
F438 25 28 0A 0F 02 38 ED CD = 38
F440 E9 34 0A 92 F3 C3 CC F3 = F8
F448 48 41 90 07 C4 50 46 49 = 59
F450 90 64 4D 89 07 78 65 6A = BE
F458 7E 80 09 41 62 29 A0 90 = C3
F460 A0 1C 56 3F 3F 2D 17 1F = 01
F468 37 77 44 0F 59 20 43 20 = F5
F470 51 3A 6D 42 0D 49 5C 44 = 20
F478 19 5D 00 9A 1C 04 00 43 = 61
F480 FE 06 C0 05 3D F4 00 00 = 0F
F488 2E FE 00 2C 00 00 06 FE = 60
F490 06 00 5C FE 06 00 70 FE = 63
F498 00 00 39 FE 05 10 F8 09 = A6
F4A0 00 A3 FE 05 91 F3 00 2C = 66
F4A8 0D 2C 00 2C 00 00 07 FE = 27
F4B0 06 00 00 7C F7 00 00 99 = 1C
F4B8 FE 06 00 06 FF 00 00 F6 = FF
F4C0 F6 09 00 D2 F6 0A 2C 00 = 07
F4C8 2C 00 00 00 F2 27 1E 03 = 60
F4D0 42 1E 09 00 A0 F7 05 9C = 62
F4D8 CE 05 72 CE 00 00 2C FF = 46
F4E0 08 2C 04 00 C2 C9 03 09 = D1
F4E8 05 9C F9 07 07 07 07 07 = 0D
F4F0 07 00 00 7A 1E 96 00 94 = 41
F4F8 22 05 60 1F 0A 00 08 F6 = 5D
F500 00 C8 F6 00 2C 00 2C 00 = 31
F508 00 7E F8 09 00 0F F7 00 = 07
F510 00 75 F9 00 2C 00 00 93 = 3D
F518 F7 16 06 0C 3A 56 21 42 = 34
F520 41 53 49 43 1A 00 07 7F = C4
F528 20 31 39 38 35 20 20 03 = 8A
F530 2E 4E 69 63 6B 6F 6C 6C = F7
F538 73 FD 36 53 30 3E 02 C0 = 3E
F540 01 16 CE 60 0D 3E 00 C8 = 69
F548 01 16 11 19 F5 01 20 00 = 57
F550 CD 3C 20 21 61 F5 E5 01 = 06
F558 D4 98 C5 01 20 70 C3 00 = 7A
F560 FE 2A 32 5C 36 3E 20 F9 = CE
F568 2D 20 22 30 5C 10 07 FD = 2D
F570 36 31 02 C8 95 17 CD 60 = 5F
F578 16 3E 00 CD 01 16 CD 2C = 31
F580 0F CE 8A F2 FD C3 00 7E = CE
F588 30 12 FB C0 38 66 20 40 = F0
F590 2A 59 5C CD A7 11 F0 36 = 07
F598 00 FF 18 DD 2A 59 5C 23 = F5
F5A0 30 5C CD F9 19 70 B1 C2 = 05
F5A8 61 F6 DF FE 0D 28 C0 FD = 26
F5B0 C0 32 46 C4 AF 00 CB 6E = FC
F5B8 00 3E 19 FD 96 4F 32 9C = 04
F5C0 5C F0 C0 01 FE F0 36 00 = 56
F5C8 FF FD 36 0A 01 CD 69 F3 = 66
F5D0 7A F0 CB 01 A6 F0 CB 36 = 6B
F5D8 4E C4 CD 0E 3A 3A 5C 3C = F9
F5E0 F5 21 00 00 F0 74 37 FD = 88
F5E8 74 26 22 65 5C 21 01 00 = EF
F5F0 22 16 5C CD 00 16 FD CB = 8F
F5F8 37 AE C0 6E 0D F0 CB 05 = F7
F600 EE F1 47 FE 0A 38 02 C6 = 2E
F608 07 CD EF 15 3E 20 D7 78 = 55
F610 11 91 13 CD 0A 0C AF 11 = 50
F618 36 10 CD 0A 0C ED 4B 05 = 0B
F620 5C CD 1B 1A 3E 3A D7 ED = 9A
F628 4B 47 5C 06 00 CD 1B 1A = F6
F630 CD 97 10 3A 3A 5C 3C 28 = A0
F638 1D FE 09 28 09 FE 15 20 = 03
F640 03 FD 34 0D 01 03 00 11 = 5A
F648 70 5C 21 44 5C FD C0 0A = 5F
F650 7E 20 01 09 E0 00 FD 36 = 00
F658 0A FF FD C0 01 9E C3 79 = AC
F660 F5 ED 43 49 5C 2A 59 5C = AB
F668 ED 21 D3 F6 E5 2A 61 5C = 01
F670 37 ED 52 E5 60 69 CD 6E = 5F
F678 19 22 06 CD 08 19 CD E8 = 92
F680 19 C1 79 30 08 20 20 C5 = 55
F688 03 03 03 03 20 ED 00 53 = 02
F690 5C 55 CD 55 16 E1 22 53 = 5F
F698 5C C1 C5 13 2A 61 5C 2B = 07
F6A0 2D ED B8 2A 49 5C EB C1 = 48
F6A8 70 2B 71 2B 73 2B 72 F1 = 38
F6B0 C3 6F F5 3E 10 01 00 00 = 76
F6B8 C3 E8 F5 CD 63 22 DA F9 = 07
F6C0 24 21 01 F6 36 01 ED 43 = 73
F6C8 B0 5C C9 21 D1 F6 36 00 = F3
F6D0 C9 00 CD F5 F6 CB 7A C0 = 06
F6D8 CB 7B C0 CD 02 F6 D0 C3 = 46
F6E0 40 20 ED 43 7B 5C CD EB = 18
F6E8 F6 00 C3 EC 22 20 0F 90 = 0C
F6F0 D0 C3 00 22 C9 CD 02 F7 = FC
F6F8 47 C5 CD D3 F7 09 C1 51 = 50
F700 4F C9 CD D3 20 DA 00 F7 = C3
F708 00 01 C0 20 FF C0 CD EE = 60
F710 16 CD F5 F6 CB 7A C0 CD = 63
F718 76 C0 2A 7D 5C 7B 94 16 = 06
F720 01 30 04 16 FF 7C 90 47 = 9B
F728 79 95 1E 01 30 04 1E FF = 70
F730 7B 91 4F 20 30 04 6B 05 = 09
F738 AF 50 10 07 B1 C0 58 41 = 4F
F740 D5 16 00 60 78 1F 55 28 = 0F
F748 03 BC 38 07 94 4F 0D C1 = 70
F750 C5 18 04 4F D5 0D C1 7A = C9
F758 70 5C 78 94 47 70 5C 03 = 56
F760 38 4F C0 C2 F6 0D 79 10 = 93
F768 D9 01 C3 4D 0D C0 ED 10 = A1
F770 C0 F5 F6 C3 32 F7 00 00 = A4
F778 92 00 00 00 CD 05 1E 21 = 91
F780 4F FF A7 ED 42 30 0A 21 = B7
F788 C1 C9 A7 ED 42 30 02 CF = 61
F790 19 00 C9 C6 A2 20 D4 F9 = 53
F798 24 ED 43 0D F8 C0 A2 20 = F3
F7A0 DA F9 24 ED 43 09 F8 C0 = F6
F7A8 A2 2D D4 F9 24 ED 43 07 = FD
F7B0 F8 CB A2 20 DA F9 24 ED = 70
F7B8 43 0D F8 2A 0D F8 ED 5B = AF
F7C0 07 F8 CD 05 03 C0 EF F7 = 37
F7C8 20 06 C0 FA F7 C0 10 14 = 08
F7D0 30 02 13 13 18 E0 53 02 = C0
F7D8 F8 C0 FA F7 20 0A CD EF = 09
F7E0 F7 C0 18 07 30 02 13 13 = 0E
F7E8 1A E0 53 07 F8 18 CC ED = 28
F7F0 5B 05 F8 2A 09 F8 A7 E0 = 17
F7F8 03 C9 00 5B 07 F8 2A 00 = 97
F800 F0 A7 ED 52 C9 00 00 00 = A7
F808 00 00 00 00 00 CB 7A 20 = 45
F810 05 CB 7B 20 01 C9 CF 19 = 1B
F818 2A 4F 5C 23 23 23 23 23 = 04
F820 11 29 F8 73 23 72 C3 CB = CA
F828 1F CD 03 00 FE 2C 38 5C = A4
F830 FE 16 28 1E FE 06 28 4A = D8
F838 F0 0E CA 3E F9 FE 08 CA = 0C
F840 47 F9 FE 07 CA 5B F9 C3 = 28
F848 F4 07 11 3F F8 33 0E 5C = 02
F850 10 06 11 4A F8 32 0B 5C = 0D
F858 2A 51 5C 73 23 72 C9 11 = 8F
```


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# Dumped in code

*A machine code screen dump routine for the 464 and Brother 1009 printer by* ***John Durst***

When you have a dot-matrix printer connected to the Centronics port of your Amstrad one of the things you almost certainly will want to do is to print out the contents of the monitor screen, to do a "Screen Dump" In the ordinary way this is not directly possible – as can be done with the old ZX printer "*Copy*" command on the Spectrum. But almost any combination of printer and computer can be persuaded to execute a Screen Dump with the help of a short machine code routine

The problem in every case is that of scanning the display file, so as to read the pixels that make it up, and then present these pixels to the printer in a form which it can deal with and transfer to paper

Most dot-matrix printers have a "*Graphic*" option, sometimes called '*Dot Image*' in this mode instead of printing out a complete character (which is usually a matrix of 8 columns by 8 vertical lines) it prints just a single vertical line for each byte input The dot arrangement corresponds to the binary value of the byte, so that a byte containing "0001 1000" Binary will print out as a vertical line consisting of three blank spaces with two dots below them, followed by another three blanks.

The software problem is to arrange to scan the screen (of the display file) in groups of eight vertical bits at a time and feed them in succession to the printer

The thing that makes this not altogether straightforward, is the fact that display files store the information about the screen in horizontal lines of pixels; we have to arrange to sample the corresponding pixels in eight successive lines of the display file and combine them into a byte to be output to the printer

So far all this applies in general terms to all screen dump routines But the Amstrad 464 has a further complication. bytes output to the printer ignore bit No 7 so instead of being able to send the complete depth of a character on every pass, you can only send a maximum of ⅞ of a character In fact, because ⅞ is an awkward fraction it is easier to implement the routine if it deals with just six lines of pixels on each pass – ¾ of a character

The Display File of the 464 – in common with most display files – is set out in an horrific address system, things don't follow one another at all as you might expect Next door pixels are not necessarily in next door bytes and pixels above, or below, are not always in bytes the same distance from one another The coward's way out is to make use of a Rom routine called '*Scr Dot Position*", which delivers the correct display file address in return for the *X* and *Y* co-ordinates of the screen pixel This is fairly slow, so it means re-calculating the address for each pixel from scratch, but it is very convenient, so it also returns the "pixel mask", which extracts the bits which code for the *Ink* in the pixel – something else which dodges about confusingly – as well as altering with the Mode in use

So the technique is to get the co-ordinates of the first screen pixel (starting at top left) call the routine '*Dot Position*, find whether the pixel is set for *Pen*, or *Paper* and store the answer in the form of a set bit for a *Pen* ink, or a reset bit for *Paper* Then move the co-ordinates down one pixel – and store it too Do this for six vertical pixels and output the composite result to the printer After this, the routine moves on to the next horizontal pixel and does the same for that set of six vertical pixels ... and so on through the whole display file.

The program shown generates the code for the routine If you wanted to use an Epson printer, you would have to change Line 120 to "13,10 27,78 84 1,0 0 Also the counter byte on Line 30 six position from the end – at present '7', should be changed to '8'

Once you have *Run* the program successfully, you can forget the Basic and *Save* the routine for use on its own.

To use the program, *Call &9000* You could set up an RSX command, '*Copy*', but I don't see much point it involves extra coding – and you are much more likely to want to use the routine in the course of a program, to print out some piece of graphics In that case you would have some line like, 1000 a$ = *Inkey$.IF* a$ = "C" *Then Call &9000*

One last word of caution, always reset the printer, by switching it off and on, after you have used the routine The print-out is likely to end with the printer still in Graphics mode when it will garble the next bytes it receives including a "Reset" command!

```
SCREEN DUMP - Decimal Loading program

10 DATA 33,153,144,6,8,126,205,43,189,35
,16,249,33,160,0,205,17,188,56,4
20 DATA 41,40,1,41,34,161,144,33,199,0,1
7,145,144,6,7,26,205,43,189,56
30 DATA 251,205,49,189,19,16,244,17,0,0,
6,6,197,213,229,205,29,188,126,161
40 DATA 203,121,32,5,7,203,17,24,247,205
,47,188,79,205,153,187,169,33,163,144
50 DATA 40,2,203,198,203,38,225,209,193,
43,124,181,200,16,213,58,163,144,79,205
60 DATA 46,169,56,251,205,49,189,205,17,
185,121,46,5,205,43,189,24,3,40,1
70 DATA 19,19,205,9,187,254,252,200,14,6
,9,229,42,161,144,167,237,82,225,32
80 DATA 165,237,66,24,141
90 REM
100 REM          PRINTER CODES
110 REM
120 DATA 13,10,27,42,4,64,1,0
130 DATA 27,64,27,108,20,27,51,16
140 REM
150 REM         CHECK DATA LIST
160 REM
170 DATA 1870,1535,2350,2432,2737,2074,2
495,1118
180 RESTORE:FOR i=0 TO 7
190 x=0:FOR j=1 TO 20:READ n:x=x+n:NEXT
200 PRINT x;:NEXT
210 PRINT
220 RESTORE 170:FOR j=0 TO 7:READ m:PRIN
T m;:NEXT
230 STOP
240 REM
250 REM        POKE VALUES TO MEMORY
260 REM
270 RESTORE:MEMORY 36663
280 FOR j= 36664 TO 37020:READ n:POKE j,
n:NEXT
```

# Arcade Avenue



## Deprotection

After a long period of silence, BBC owners have been doing quite well for tips in the column over the last few weeks. Here are some more to add to the list from John Fitzgerald of London

"*Q*BERT* (Superior Software) – let the whole game load, then press *CTRL+Break* Type *Page = &1700* (ret), *Old* (ret), *List 2900* (ret) Change men% from 2 to the number of lives you want.

"*Ghouls* (Micro Power) – let the game load and then press *Break*. Then type *Page = &2200* (ret) List the first 10-20 lines LI(ves) and LEV(els) can be found Level can be 1 to 4, lives any number. Then *run* (ret)

"*Escape from Moonbase Alpha* (Micro Power) When the game has loaded press *Break* then *Old* (ret) *List* 700 (ret) P% = Hulk Pills, S% = Strength, G% = Gold Held Change these to make the game easy

"*Planetoid* (Acornsoft) – Type *Page = &3000* (ret), *Load ""*. Then type 160 ?&276B=&x = number of lives This has to be done after the title page has loaded Don't forget to press Escape to remove the SEARCHING message "

Now then, there are a couple of important messages First of all, I get many letters each week from people asking for personal replies I'm sorry but I really can't get round to answering you all individually, much as I would like to However a lot of these letters are to do with pokes, etc, that you can t get to work

You'll no doubt be pleased to hear that we are planning a special project along the lines of the complete arcade guide that will hopefully give guidelines for beginners as well as allowing me the chance to clear up some old problem pokes in greater detail

One of the machines that gives greatest difficulty is the Amstrad because the machine has a built-in protection device that stops you from merging, loading or listing Basic headers without them auto-running Many of the pokes that we receive for this machine can easily be entered into the headers of the games, before the Call statement that starts the machine code as long as you can deprotect the Basic. To do this is easy if you purchase one of the Amstrad tape back-up utilities that are advertised in the back of most computer magazines (including *Amstrad User*) – these all offer a deprotection option

The alternative is to write your own routine that replaces the existing header and loads the machine code, pokes it, and runs it Where we can, we try to print these replacement headers rather than the simple poke, but we may not always have the game in question to work it out if the person who found the poke hasn't sent it in

The problem is that you usually have to know the Call number from which the machine code starts and this may not be the same as the first location of the code Anyway, can I encourage all Amstrad hackers to send in a full replacement header if possible

To prove my point here, courtesy of our old friend Murray Pope is an infinite lives poke for Microbyte's *Er*bert* – Poke 15971 0 Here it is again surrounded by loads of boring sound set-up routines.

```
10 Memory 16383
20 Load "", 16384
30 Ink 0,0
40 Env 1,3,1,33,6,-1,80
50 Ent 5,100,5,4
60 For F= 1 to 7
70 Read A,B,C D,E F G,H,I,J,
K,
80 Ent A,B,C,D,E,F,G,H I,J,K,
90 Next
100 Data 1,10 -10,1,8,30,1,2, -
76,1, -2,2, 50,2,5,30,2,12, -
5,2,3,12, -10,1,2,110,1,6, -15,1,
-4,12, -10,1,5,30,1,2, -
125,1,3,12, -10,1,2,110,1,6, -
15,1,6,6, -20,4,2,100,4,2, -
40,4,7,4,5,3,2,20,3,4,5,3
110 Poke 15971,0 Call 26647
```

Whilst on the subject of Murray's letters – although he has already admitted that Decapiture is possible in the Amstrad *JSW*, he caused a real furore by suggesting that it wasn't. Several people wrote in with suggestions on how to get past it.

Duncan Ellis of Ilkley says, "I suggest the problem is with the blue block – this should be jumped when it is on the way down about two or three characters off the ground The timing is difficult as it moves so fast " Andrew Dunbar of Buckley says, "As the first guillotine is halfway through its descent, jump from the furthest edge of the top step and walk to safety between the two blades As the second blade rises just above your head, walk forward so that you drop into the curved recess. Jump to the right out of the ditch in such a way that you follow the blade closely as it rises You should make it!"

Andrew wants to know if you can take a ride on the yacht after pressing the trip switch, and what's the screen on the right of "Incredible –" Well the answers come from Stuart Wray who is an old *JSW* expert and who has kindly sent a map of the 132 locations. Stuart says that the trip switch is there to allow you to collect the object in The Cartography Room. The yacht business looks to be a myth

Another old friend is PF The Tetrach, who gives the same tip as Andrew and also follows it on with a request for help with Incredible Big Hole In the Ground. "I've only managed to reach it once with my last life which fell straight to the floor and died. Are there any alternative routes to this screen?" Stuart's map shows that Incredible Big Hole In The Ground covers three screens, to the right of which is Loony Jet Set – does that help, Andrew? The screen seems only accessible via the left platform of Beam Me Down Scotty and Teleport.

Dennis Goodwin of Wallingford has had trouble with the room Star Drive "I could get in, but not out as all the platforms keep moving left. Software Projects helpfully supplied this answer – on the right of the screen are three blocks Jump on the middle one and, as soon as you land, jump off again Beware of the wall, I think this is a trap "

I'm sorry, but we have no plans to print the map as yet since we really do feel that *JSW* is an ageing game, despite the boost of the extra rooms, it also has had infinitely more coverage in the column than some other releases However, I will consider sending photocopies out to those who send in a stamped addressed envelope clearly marked *JSW*

### We are searching for the top UK computer games player – the best there is!

The very best of Britain's game players will get to fight it out on a number of top secret new games – scheduled for release in the autumn

**Here's how it works**

Study the table below and look at the column for the machine you have – these are the games you'll need to master. Send your high scores in on the form below, making sure that your scores are authenticated by a responsible individual signing the form. Any score achieved using technical short cuts – such as infinite lives Pokes – will not be accepted.

Between now and September Tony Kendle will be keeping you up to date on the *Arcade Avenue* page with just who has the scores to beat. Then in September the top three scorers on each machine will battle it out for a place in the final and the chance to be the first to play our top secret games

| | Commodore | BBC | Spectrum | Amstrad |
|---|---|---|---|---|
| Game 1 | Suicide Express | Elite | Technician Ted | Sorcery |
| Game 2 | Beach Head | Jet Pac | 3D Star Strike | Splat |
| Game 3 | Shoot the Rapids | Chuckie Egg | Cyclone | Manic Miner |

**Game Wizard Entry Form**

Micro

Game 1 score

Game 2 score

Game 3 score

Name

Address

Your signature

Witness s signature

# Tony Bridge's Adventure Corner



## On the warpath

Adventure Corner takes a bit of a departure this week from the usual tack. Adventuring on microcomputers can trace its origins back to wargaming and many adventurers are also keen wargamers. The Corner will not become Wargame Corner, but we'll occasionally be looking at the more interesting programs.

Two very interesting wargames have been recently released. The first is *The Bulge* from Lothlorien, running on the Commodore and Spectrum. Lothlorien were among the first software houses to produce wargames for the more popular machines, and I remember them fondly for their early popular programs like *Johnny Reb*, which hardly left my computer for several weeks.

Before the Spectrum, however, was the Atari range of computers, and the classic wargame for those machines was the legendary *Eastern Front*, written by the equally legendary Chris Crawford. If you have an Atari and haven't yet seen this wonderful program, then beg, borrow, etc., as soon as you can.

The atmospheric scenario, the assault on Russia by the German forces in the Second World War, is matched by the very easy-to-use command input (joysticks all the way) and the smooth-scrolling map.

The reason I mention *Eastern Front*, apart from the fact that I'd like more people to know about it, is that Lothlorien's package is very much a descendant, and a worthy one at that. The map, as in *Eastern Front*, covers a larger area than the screen, which scrolls as you move your cursor to the edge. Unlike *EF*, there is a second, so-called *Global* map, available, which gives an overview of the whole map. This facilitates moving across large distances, after which you can toggle back to the *Battle* map upon which commands can be given to the various units.

Information on enemy and friendly units can be called up at any time simply by placing the cursor over that unit. Your movement commands are input in the same way, with the cursor being moved to the destination. Movement is undertaken by your units as soon as your orders are received, and you can leave them to get on with it – they will eventually arrive in their own time.

Thus, it's not simply a case of shoving all your units up against the enemy and watching them slog it out. Plans must be laid early in order for your units to arrive at the same location that the enemy will occupy *in the future* (I've lost count of the number of times that I have sent my armies to build an impenetrable wall a couple of miles *behind* the enemies advance!). As in all well-designed wargames, the forces are well-balanced and historically accurate, of course.

Most of the time, the game is easy to play (by one or two players) by virtue of both the command input, the scrolling and the excellent manual which also contains historical background and victory hints. I sometimes found the graphics a little confusing (there is an option to re-design the colours and so on) and the command input was occasionally frustrating, but all in all, I spent many a happy hour with *The Bulge*.

CCS have also been around for most of the life of the Sinclair machines, and some of their programs (such as *Dallas*) kept me awake to the small hours. The latest release, *Arnhem, The Market Garden Operation* is equally addictive. This program, too, finds a parallel with an Atari program. As *Eastern Front* is the classic large-scale strategic and historically accurate computer wargame, so *Operation Whirlwind* is, for me, the classic small-scale tactical game. It has no historical scenario, involving the player in a bid to move his forces from one side of the map to the other in order to capture the enemy's city.

*Arnhem* is very similar, except that the overall scenario concerns the Allied forces bid to secure bridgeheads over the rivers near Arnhem in Holland, again in the Second World War.

Much of the action in *Operation Whirlwind* is centred around the *'traffic jams'* that occur around the bridges as all your forces attempt to cross against heavy enemy opposition. This was exactly the trouble that the Allies found at Arnhem, and the problems are very well recreated by CCS in this program. There are several mini-scenarios contained within the program, each one posing a different problem for the player or players.

As in *Operation Whirlwind*, the order of play is fairly uncluttered, which makes a change from most wargames, though there is a rather complex Reporting routine. Input is by cursor keys or joystick throughout.

Although I've drawn parallels between the two new games and other, older, games, none suffer from the comparisons. If you're an adventurer casting around for something in a different vein, yet retaining the necessary atmosphere and strategy problems, then these two programs should certainly be looked at.

Regular readers will know Hugh Walker's name, and will be interested to know that he recommends another CCS game, *Nato Alert*. Although I haven't seen it, it appears to be a resource/management game, rather than a wargame of the sort of I have been looking at so far this week. The scenario, of course, is Europe threatened by nuclear war, and your task is to prepare for such a war in the best way possible by husbanding your resources as boss of the NATO alliance. Although it's rather slow, says Hugh, as it is written in Basic, it makes a nice rest from adventures.

That's it for wargames for a while. I hope regular adventurers won't think it a betrayal – let me know if you want me to carry on this very occasional look at games outside our immediate area of interest.

A couple of pleas for help now: Doreen Bardon is stuck in *Odyssey of Hope* from Martech, in particular the Bees and the Harpies. Can you help her? Write to Doreen at Lendal Cottage, High Street, Slingsby, Yorks YO6 7AE.

Paul Setterford is stuck in *Velnor's Lair*, Derek Brewster's first (as far as I know) attempt at an adventure, and one that still crops up in my mail. You haven't given me much information, Paul, but try feeding the rats with the apples, then search the rags. You'll find a telescope – take this to the crack and then use it to find a magic word. This will help you through the crack, and thus progress further into the caves. The crocodiles that you'll come across later have always been a source of trouble – feed them with a monster, then type *Use Bath* (you'll need the oars). To get those oars search the fungi. If you want to write to Paul with more help, his address is The White Cottage, Abbey Drive, Laleham, Middlesex TW18 1SR.

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**SPECTRUM PLUS** Interface 1 microdrive printer 4 cartridges over £130 of s/w (original only) books mags, cassette recorder Sell £310 ono Tel 0703 738432 after 6pm

**ZX SPECTRUM PLUS** 2X microdrive interface cartridge s/w £170 p&p Tel Chelmsford 360731 after 6pm

**48K SPECTRUM PLUS,** Kempston interface with cassette recorder 7 games and mags Only £150 ono Tel Ilfd 158 3630

**SINCLAIR QL** including QL magazines and chess £270 ono Tel 01 248 0069

**48K ZX SPECTRUM** with Currah microspeech Quickshot joystick, magazines black and white TV plus 40 games Tel 01 452 8547

**48K SPECTRUM PLUS** Currah speech joystick interface plus good s/w All originals Sell £200 ono Tel 01 871 2870 (after 4pm)

**SPECTRUM 48K** microdrive interface 1 joystick Rakoshie printer Dk tronics keyboard tape recorder speech synthesiser B&W TV and books £300 ono Tel Haywards Heath 467352

**48K SPECTRUM PLUS** Interface 1 microdrive interface with driving s/w for Epson Oki etc All boxed complete with leads, manuals etc also over 25 items of s/w The lot for £175 Tel 01-898 7228

**SPECTRUM PLUS** for sale 3 weeks old with plenty of books mags + s/w £100 Tel 01 898 0225 ask for Paul

**SINCLAIR QO** as new Guaranteed RS232 lead £298 Tel Worthing 0903 211438

**SPECTRUM** Quickshot joystick with Protek switchable I/F £5 ono Tel 031 663 4934

**48K SPECTRUM** less than one month old speech synthesizer 11 games £80 ono Tel 01 888 6580 after 6pm.

**SPECTRUM 48K** plus Kempston interface Quickshot 2 Joystick Sinnechip keybates sound amplifier S/W £100 of mags £200 ono Tel 0705 252231

**48K SPECTRUM** joystick and interface £280 ono Tel Belden 37243 eves

**SPECTRUM 48K** Sigma I keyboard Dual port interface plus joystick magazines £150 ono Tel 0642 322704

## Wanted

**POWERFUL,** accurate air rifle .177 with dipley sight, targets and 1500 pellets mint cond box with spare spring and washers Swap for Spectrum 48K Must have parents consent Tel 0325 312417

**SWAP** CBs Home Base and mobile + accs for Commodore 64 or best computer or WHY Can Spill Tel W Frisby (0836) 26317

**WANTED 16K RAM** pack for Vic 20 Will accept switchable Phillip Rochester 18 Lanvanor Road Peckham London SE15 2BW

**SWAP CARIO MT70** 20 cassettes 10 ribbons for CBM 64 disc drive or 581 printer Tel 01 316 1037

**DRAGON 32** wanted Tel Great Missenden 6781 ask for Oliver

**48K SPECTRUM** last compiler by OCL accounts Lotsest by Eclipse Will swap for other Spectrum + programs Tel 01 882 2311 after 6pm

**WANTED CBM 64** with tape recorder Up to £100 offered Must be in good condition Tel 01 936 2425

**SAP SPECTRUM 48K** + ZX printer + DK keyboard + tape recorder + Dragon 32 1 black and white TV + joystick for Amstrad computer Tel 01 980 448

**SWAP SOUND MOVIE CAMERA** with focus plus projector and screen worth £270 for Amstrad CPC 464 colour or green screen Tel 0733 78758

**WANTED** non working BBC micro MZ80K in/output edx Sword (GL MS computer MZ 700 data recorder Offers on condition of equipment. Clvie Tel 0442 2867

**SWAP CBM64** C2N and accessories for my new 48K Spectrum cassette recorder AGF interface joysticks amplifier books and mags or sell £170 ono Tel Teignmouth 78156

**WANTED SYSTEM 15000** Frankie Gamn Any database program Contact Lee McAllester 76 Cann Hall Road Leytonstone, London E11 3JF Tel 01 534 3563

**WANTED** microdrive cartridges in good condition must be reasonable Tel 0640 68522 after 6pm

**WANTED** microdrive cartridges for Spectrum Pay up to £1 each Tel 0274 67838

**HAVE SPECTRUM VTX 5000** modem Unwanted prize Will swap for Y2SEU FRG7 or any HF Rig Tel Southport (0704) 42664

**WANTED** Atari 800 (48K) and also drive can collect if necessary Must be low priced Tel (Dover) 216000 ask for Steve

**AMSTRAD** software pack £35 TASWORD 464 £10 or swap for MASTERFILE or Dialog HOME ACCOUNTS MICROSCRIPT MICROPEN & MICROSPREAD discs all £65 or £25 each swaps considered DMP1 £125 Tel 0203 316598

**WANTED** ZX printer for Currah Microspeech + demo tape. Tel Harwich (0255) 553403

**WANTED** Modem and disc drive for Oric Atmos 48K All books and tapes plus any other hard/software Phone (0482) 587345 after 6pm John

**SWAP** Mattel console with ten games hme scalectric with two cars for Spectrum plus Write to C Owen 90 St Johns Road Dudley West Midlands DY2 7AE.

**SWAP** my Acorn Electron with cassette recorder and software (inc Elite Blagger etc) and Acorn User and Electron User mags for Atari 800XL plus 1010 recorder Tel (0734) 302638

**SWAP** 48K Spectrum software mags 2x100 data recorder and joystick interface for Atari 800XL and data recorder or sell for £140 ono Tel Ipswich 80013.

**WANTED** Commodore CBM 4008 4016 or 4032 Will pay reasonable price Phone Bhagani 01-933 7856 ext 44

**WANTED** 48K Spectrum Will pay £60 plus p/p Tel 061 456 9999 anytime up until 4.30pm Mon to Fri Must be good working order

**SWAP** Atari VCS + 6 carts + j/stick for game A phacom printer + pager or sell for £70 Tel Andrew Macdonald on 0831 83865

**SWAP** Oric Atmos 48K with some software for absolutely anthing will accept first interesting offer received Apply John Cunningham 34 The Fennels Harlow Essex or ring (0279) 33109 after 7pm

**SPECTRUM** 48K swap for Dragon 64 Also swap software one for one Many good titles Phone (Newport Gwent) 52599 after 6pm

**WANTED** CBM64 colour monitor £150 paid David 01-853 0712.

**SWAP** portable colour television (Philips) for micro/water drive plus printer or above plus Amstrad 7090 twin tape portable hifi for disc drive and printer Tel York (0904) 29617 anytime

**SWAP** 48k Spectrum + tape deck + joystick + Kempston interface + top software titles for CBM64 + C2N data recorder or sell for £150 + 8 months guarantee very good condition Ask for Michael or Ch 01 203 5356 evenings

**WANTED** Seikosha GP100A printer for Dragon not more than £100 Tel 0924 372824

**SWAP** my Currah speech and Zaxxon (Sega) for a Spectrum + keyboard Currah speech and Zaxxon in vgc Will expect keyboard to be in vgc also Tel 0324 35180

**WANTED** for C64 Does anyone have Daley Thompson's Decathlon or Hyper Sports? Will swap Bruce Lee + Fraid for either one! Tel Conn after 5pm at 01 888 4124 urgent.

**AMSTRAD** pen pals wanted Write to Edward Wilson 7 Gawthorpe View off Dukes Brow Blackburn Lancs

**SPECTRUM** pen pal wanted 10 years and upwards Male or female To swap programs cheat tips etc All letters answered Write to Dave McManus 38 Connaught Ave Mutley Plymouth Devon PL4 7BY

**WANTED** reliable inexpensive word processor full size Qwerty keyboard disc drive/tape optional VDU full size printer cash Local area preferred from where can collect. Tel Devon 865407

**SWAP** 48K Spectrum Kempston pro interface DK tronics keyboard Quickshot Data recorder over 50 games for CBM 64 + 2CN Data Recorder Tel Swansea (0792) 201890 after 4pm and ask for Stuart

## ADVENTURE HELPLINE

**Espionage Island on Spectrum** How do I move the large rock? Paul Hard 27 Brandford Road South Reddish Stockport Cheshire SK5 7CA

**Eric the Viking on Amstrad.** I can't manage to get the fire started to melt the icicles on the iceberg. I also can't find a light source when I'm in the cairn. Can anyone help? J M Hood 12 Valleyside Kingshill Swindon Wilts

**Mordon's Quest on Spectrum** How do I pass the waterfall? Who is the king of the jungle? Matthew Musgrove 5a Shepherds Lane, Bracknell, Berks RG12 2DE

**El Dorado on Spectrum** I'm new to adventures — can I go through the deep valley or through the valley with Essure? If not where? M Ward, 41 Watling Street Bury BL8 2JD

**Jewels of Babylon on Amstrad** I cannot pass the cannibals village. Can the vertical slab of rock be moved? Help! Kevin O Connor 128 Heronfield Close Church Hill, Redditch Worcs B98 8QW

**Fantastic Diamond on Enterprise** I am completely stuck! How do I cross the river and/or open the manhole? Andrew Irwin 28 Claydon Road Wall Heath Kingswinford W Midlands DY6 0HR

**Return to Eden on Amstrad** How do I get on the boat and pass the boatman to get to the emerald isle? A Ware, 78 Brownfield Road, Cheltenham, Glos (Tel 0242 31087)

**Classic Adventure on BBC** How do I get out of the repository — what do you have to do? C Ramsey 31 West Way, Neasden, London NW10 0LU

**Classic Adventure on C16** I'm an absolute beginner and can't get anywhere after picking up the food etc David Ironside 59 Melville Heath South Woodham Ferrers Chelmsford Essex

**Twin Kingdom Valley on Spectrum** How do I get the master key from the dragon and what do I do with the wooden staff? David Wright 10 Burrell House Haggard Road Twickenham, Middx TW1 3AG

**Sherlock on Spectrum.** How do I go places in the cab and where do I want to go? Clevis Paden, 161/2 Chapel Street, Heronsgham Warminster Wilts

**Kentilla on Spectrum.** How do I enter (or cross) the waterfall? What must I put in the crucible? How do I open the steel door? Vasco Novais de Oliveira Rua João Luis de Moura No 52 2750 Cascais, Portugal

# Charts

## Amstrad

| | | | | |
|---|---|---|---|---|
| 1 | (1) | Way of the Exploding Fist | (Melbourne House) | £9.95 |
| 2 | (3) | Red Moon | (Level 9) | £6.95 |
| 3 | (1) | Dun Darach | (Gargoyle) | £8.95 |
| 4 | (2) | Beach head | (Access/US Gold) | £9.95 |
| 5 | (–) | Nonterraqueous | (Mastertronic) | £1.99 |
| 6 | (4) | Alien 8 | (Ultimate) | £9.95 |
| 7 | (–) | Red Arrows | (Database) | £8.95 |
| 8 | (5) | Knight Lore | (Ultimate) | £9.95 |
| 9 | (7) | Rocky Horror Show | (CRL) | £8.95 |
| 10 | (–) | Finders Keepers | (Mastertronic) | £1.95 |

**Bubbling Under**

| | | |
|---|---|---|
| Max Office | (Database) | £5.95 |
| Sorcery | (Virgin) | £8.95 |

## Atari

| | | | | |
|---|---|---|---|---|
| 1 | (1) | Bounty Bob Strikes Back | (US Gold) | £9.95 |
| 2 | (2) | Airwolf | (Elite) | £6.95 |
| 3 | (5) | Hard Hat Mack | (Ariolasoft) | £9.95 |
| 4 | (7) | Drop Zone | (Microprose/US Gold) | £9.95 |
| 5 | (–) | Mig Alley Ace | (Microprose/US Gold) | £9.95 |
| 6 | (4) | Archon | (Ariolasoft) | £11.95 |
| 7 | (3) | Bruce Lee | (Datasoft/US Gold) | £7.95 |
| 8 | (6) | Miner 2049 er | (Big 5) | £9.95 |
| 9 | (–) | Kaiser Cousins | (English Software) | £9.95 |
| 10 | (9) | Ghostbusters | (Activision) | £14.99 |

**Bubbling Under**

| | | |
|---|---|---|
| Colourspace | (Llamasoft) | £7.95 |
| MULE | (Ariolasoft) | £14.95 |

## BBC

| | | | | |
|---|---|---|---|---|
| 1 | (1) | Revs | (Acornsoft) | £14.95 |
| 2 | (–) | Beach head | (Access/US Gold) | £9.95 |
| 3 | (2) | Alien 8 | (Ultimate) | £9.95 |
| 4 | (6) | Elite | (Acornsoft) | £12.95 |
| 5 | (–) | Red Moon | (Level 9) | £6.95 |
| 6 | (5) | Atic Atac | (Ultimate) | £7.95 |
| 7 | (–) | Contraption | (Icon) | £8.95 |
| 8 | (3) | Repton | (Superior) | £9.95 |
| 9 | (4) | Magic Mushrooms | (Acornsoft) | £11.95 |
| 10 | (–) | Bobby Charlton's Soccer | (Dacc) | £11.95 |

**Bubbling Under**

| | | |
|---|---|---|
| Gerbal Lynx | (Durell) | £8.95 |
| Knightlore | (Ultimate) | £9.95 |

## Commodore 64

| | | | | |
|---|---|---|---|---|
| 1 | (1) | Way of the Exploding Fist | (Melbourne House) | £9.95 |
| 2 | (2) | Hypersports | (Imagine) | £7.95 |
| 3 | (3) | Elite | (Firebird/Acornsoft) | £14.95 |
| 4 | (10) | Frankie goes to Hollywood | (Ocean) | £9.95 |
| 5 | (7) | Rockford's Riot/Boulderdash | (Monolith) | £9.95 |
| 6 | (8) | Fourth Protocol | (Hutchinson) | £12.95 |
| 7 | (–) | Mr Do | (Datasoft/US Gold) | £9.95 |
| 8 | (9) | Shadowfire | (Beyond) | £9.95 |
| 9 | (6) | Soft Aid | (Various Artists) | £4.95 |
| 10 | (–) | Pitstop II | (Epyx/US Gold) | £9.95 |

**Bubbling Under**

| | | |
|---|---|---|
| Thing on a Spring | (Gremlin Graphics) | £7.95 |
| Tour de France | (Activision) | £9.99 |

## Spectrum

| | | | | |
|---|---|---|---|---|
| 1 | (1) | Frank Bruno's Boxing | (Elite) | £6.95 |
| 2 | (2) | Hypersports | (Imagine) | £7.95 |
| 3 | (–) | Highway Encounter | (Vortex) | £7.95 |
| 4 | (–) | Dynamite Dan | (Mirrorsoft) | £6.95 |
| 5 | (7) | Soft Aid | (Various Artists) | £4.99 |
| 6 | (3) | Glass | (Quicksilva) | £7.95 |
| 7 | (4) | Nick Faldo Plays the Open | (Mind Games) | £9.99 |
| 8 | (10) | Rocco | (Gremlin Graphics) | £7.95 |
| 9 | (8) | Shadowfire | (Beyond) | £9.95 |
| 10 | (7) | Jet Set Willy 2 | (Software Projects) | £7.95 |

**Bubbling Under**

| | | |
|---|---|---|
| Fourth Protocol | (Hutchinson) | £12.95 |
| Spy vs Spy | (Beyond) | £9.95 |

All figures compiled by Ram/C

## Top Twenty

| | | | |
|---|---|---|---|
| 1 | (1) | Hypersports *(Spectrum/C64)* | Imagine |
| 2 | (2) | Way of the Exploding Fist *(C64)* | Melbourne House |
| 3 | (3) | Frank Bruno's Boxing *(Spectrum)* | Elite |
| 4 | (20) | Frankie Goes to Hollywood *(Spectrum/C64)* | Ocean |
| 5 | (4) | Elite *(C64/BBC/Electron)* | Firebird/Acornsoft |
| 6 | (5) | Soft Aid *(Spectrum/C64)* | Various Artists |
| 7 | (6) | Nick Faldo Plays the Open *(Spectrum/C64)* | Mind Games |
| 8 | (11) | Fourth Protocol *(Spectrum/C64)* | Hutchinson |
| 9 | (–) | Red Moon *(Spectrum/C64/BBC/Electron/Amstrad)* | Level 9 |
| 10 | (12) | Shadowfire *(Spectrum/C64)* | Beyond |
| 11 | (15) | Dun Darach *(Spectrum/Amstrad)* | Gargoyle |
| 12 | (7) | Jet Set Willy 2 *(Spectrum/C64)* | Software Projects |
| 13 | (16) | Rockford's Riot/Boulderdash *(C64)* | Monolith |
| 14 | (–) | Dynamite Dan *(Spectrum)* | Mirrorsoft |
| 15 | (8) | Glass *(Spectrum)* | Quicksilva |
| 16 | (13) | Rocco *(Spectrum)* | Gremlin |
| 17 | (–) | Mr Do *(Spectrum/Atari)* | Datasoft/US Gold |
| 18 | (–) | Highway Encounter *(Spectrum)* | Vortex |
| 19 | (9) | Spy vs Spy *(Spectrum/C64)* | Beyond |
| 20 | (17) | Nodes of Yesod *(Spectrum)* | Odin |

Figures compiled by Ram/C

## Readers' Chart No 37

| | | | |
|---|---|---|---|
| 1 | (1) | Elite (C64/BBC/Electron) | Firebird/Acornsoft |
| 2 | (5) | Hypersports (Spectrum) | Imagine |
| 3 | (7) | Way of the Exploding Fist (C64) | Melbourne House |
| 4 | (3) | Soft Aid (Spectrum/C64) | Various Artists |
| 5 | (2) | Dun Darach (Spectrum/Amstrad) | Gargoyle |
| 6 | (4) | Shadowfire (Spectrum/C64) | Beyond |
| 7 | (6) | Revs (BBC) | Acornsoft |
| 8 | (9) | Knight Lore (Spectrum/BBC/Amstrad) | Ultimate |
| 9 | (10) | Spy vs Spy (Spectrum/C64) | Beyond |
| 10 | (8) | Confuzion (Spectrum/Amstrad/C64/BBC/Electron) | Incentive |

**Winning phrase No 37 "Had diced snail for tea" from Charles Morgan of Croydon, Surrey, who receives £25 Runner up "Dracula dies of the sun" from Lee Russell of London E7**

## Now voting on week 39 – £25 to win

Each week *Popular* is compiling its own special software top ten chart – compiled by YOU

And each week we will send £25 to the person who sends in, with their chart votes, the most original (witty, neat or clever – but never rude) phrase or sentence made up from the letters (you don't have to use them all) in the titles of the top three programs in this week's chart, published above

You can still vote in the chart without making up a slogan – but you won't be in with a chance of winning the prize

All you have to do is fill in the form below (or copy it out if you don't want to damage your magazine) and send it off to Top 10, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 7PP

**Voting for Week 39 closes at 2pm on Wednesday August 21 1985 Entries received after that time will not be eligible for inclusion in that week's voting The judges decision is final. Only one entry per individual per week will be allowed.**

**Name** ..................................... **My top 3: Voting Week 39**

**Address** ..................................... 1.....................................

..................................... 2.....................................

..................................... 3.....................................

**My phrase is:** .....................................

### LOGICAL

*Mount Challenge* looks, on screen, like a terribly platformy game, but turns out to be a rather entertaining mixture of strategy and timing. Nothing astounding, but an original and even addictive game nevertheless

The task is to guide a rather naffly designed sprite up over 20 screens to reach the top of a mountain where redemption of all mankind awaits. There are, as ever, nasty sprites that bounce around and get in the way and stomp on you. So far so tedious

However, the real point of the game is logical. Different platform blocks are either red or green. Depending on their colour they react differently when you move on them. Green blocks let you move up, down, left or right by one step if the energy button is pressed on, but won't let you move anywhere if it is off. Red blocks let you move one step if energy is off and three steps if it is on. Thus to make your way on the screen you need to make a complex mixture of left, right, up, down, power off, on moves – it can take a lot of thought to see how some of the screens can be done at all. Add the nasty sprites which sometimes mean you have to work things out very quickly and you have a surprisingly entertaining game

£2 40 is certainly a close to budget price and I'd say if the duff graphics don't put you off utterly, then this is well worth tracking down.

**Program** *Mount Challenge*
**Price** *£2 40*
**Micro** *Spectrum*
**Supplies** *Asvoquelle*
*Blakemoor*
*Marshbrook*
*Church Stretton*
*Shropshire*
*SY6 6QA*

### ON CUE

*Tournament Snooker* is an excellent version of the TV favourite for the Einstein – a much maligned and ignored machine in my opinion!

Little to say about the game really. Most computer snooker games use the same systems, move a cursor around to determine the position of the cue and then fiddle with the power and spin to make the cue ball do what you want it to

The Einstein version actually has a line to represent the cue attack and two bar lines to represent the kinds of spin and amount of force to be used. It's easy to use and the ball doesn't creep around like a snail

**Program** *Tournament Snooker*
**Price** *£14 95*
**Micro** *Einstein*
**Supplier** *Hard Software*
*6 Arum Way*
*Leicester*
*LE3 6NB*

Pick of the week

### INGENIOUS

Addictive Games is inextricably linked with the amazingly successful *Football Manager*, but from time to time the company does release other titles for people who don't want to play football. *Boffin* is an arcade game for the BBC and Electron – it happens to be one of the best I've seen on the machines

Once you accept that Boffin is basically a dodge and collect game there is much to enjoy. For one thing the graphics are pretty good – your figure is big with eyes that roll whenever something goes wrong and backgrounds have more detail than you expect from BBC games

It also works quite well as a game, to drop any distance you must have your umbrella up, whereas to jump you must have it folded down. Overcoming the various obstacles requires some ingenuity and thought, as well as a long and tedious experience of repeated failures

There are a couple of dozen screens and much to entertain and amuse, even the sound effects are better than average. At £9.95 it's not cheap, but as BBC arcade games go this is one of the few released recently to make Commodore and Spectrum owners envious

**Program** *Boffin*
**Price** *£9 95*
**Micro** *BBC*
**Supplier** *Addictive Games*
*7a Richmond Hill*
*Bournemouth*
*BH2 6HE*

### HOT AIR

If you thought £1 99 was pretty cheap take a look at the offerings from Central Solutions Ltd – its games retail for a mere 99p. And for that price *Valley of the Dead* has to be an excellent buy

There's nothing astounding about it – it's really a version of *Cavern Fighter* and similar games – but the game is

## This Week

| *Program* | *Type* | *Micro* | *Price* | *Supplier* |
|---|---|---|---|---|
| **Faerie** | Ad | Amstrad | £2 50 | Eight Day |
| **Ice Station Zero** | Ad | Amstrad | £2.50 | Eight Day |
| **Quann Tulla** | Ad | Amstrad | £2 50 | Eight Day |
| **Macadam Bumper** | Arc | Amstrad | £7 99 | PSS |
| **Master of the Lamps** | Arc | Amstrad | £9 99 | Activision |
| **Rock Raid** | Arc | Amstrad | £6 95 | Kuma |
| **Arnhem** | S | Amstrad | £9 95 | CCS |
| **Red Arrows** | S | Amstrad | £9 95 | Database |
| **War Zone** | S | Amstrad | £6 95 | CCS |
| **Strip Poker** | S | Atari | £9 95 | US Gold |
| **Faerie** | Ad | Commodore 64 | £2.50 | Eight Day |
| **Ice Station Zero** | Ad | Commodore 64 | £2 50 | Eight Day |
| **Quann Tulla** | Ad | Commodore 64 | £2 50 | Eight Day |
| **Secret of St Brides** | Ad | Commodore 64 | £8 95 | St Brides |
| **Cops 'n' Robbers** | Arc | Commodore 64 | £2.99 | Atlantis |
| **Pole Position II** | Arc | Commodore 64 | £39 68 | Sinclair |
| **Speed King** | Arc | Commodore 64 | £9 95 | Digital Integ |
| **Tour de France** | Arc | Commodore 64 | £8 99 | Activision |
| **Paintbox** | Ut | Commodore 64 | £9 99 | Audiogenic |
| **Castle Assault** | Arc | Electron | £3 50 | Blue Ribbon |
| **Diamond Mine** | Arc | Electron | £3 50 | Blue Ribbon |
| **Nightmare Maze** | Arc | Electron | £2.56 | Blue Ribbon |
| **Decision Maker** | Ut | QL | £89 95 | Sinclair |
| **QL Cavern** | Arc | QL | £12 65 | Sinclair |
| **Cartridge Doctor** | Ut | QL | £14 95 | Talent |
| **Decision Maker** | Ut | QL | £39.95 | Sinclair |
| **Entrepreneur** | Ut | QL | £29 95 | Sinclair |
| **Integrated Accounts** | Ut | QL | £39 95 | Sinclair |
| **Project Planner** | Ut | QL | £39 95 | Sinclair |

# New Releases




soundly programmed with adequate graphics and is surprisingly addictive

The idea is that you pilot a hot air balloon through twisting caverns controls are left right and more air, the latter command gives your balloon a lift. By a mixture of letting the balloon fall and the occasional jet of air, it's possible to keep it at a fairly regular height and (theoretically) juggle your way past the crevasses of the cavern network. Here and there, you also find nasty (well, quite cute actually) aliens that bounce around and get in the way

Good fun and, at 99p, there's not even any point in trying to copy a friend s, buy it.

**Program** *Valley of the Dead*
**Price** *£0 99*
**Micro** *Spectrum*
**Supplier** *Central Solutions 500 Chesham House 150 Regent Street London W1R 5FA*

## SCORE DRAWS

From ancient times, when fingers slid silently over plastic membranes and all graphics consisted of black and white squares, one kind of computer program has lurked darkly in the classifieds Not *Space Invaders*, nor *Chess* nor even *Manic Miner*, perhaps *Football Manager* but certainly *Pools Prediction* programs Which only goes to prove that greed is common to all. Profound really

Anyway whizzing up to date now we have *Amstrad Draw 2*, a sophisticated version of the program that first drew breath on the ZX81 It's disc based which means it can hold a vast amount of information and comes with all kinds of neat bits and bobs

Pool programs work by predicting the likely outcomes of matches by drawing statistical conclusions from a database of previous match results The bigger the database, the (theoretically) more likely the program is to predict the correct results. Using the system carefully – weighting predictions according to things like pitch condition, injuries, home or away and so on – ought to give you predictions that taking a long term view, are considerably better than informed guesswork and maybe even make you some money.

*Amstrad Draw 2* comes with a database of over 12,000 matches (and the company will regularly update it for you for a small fee) and will actually generate your pools coupon on screen so that filling it in each week is a doddle It'll even read the predictions out aloud if you have the DK Tronics speech synthesiser

After all the years this basic package has been developed from one machine to another, it's not surprising that it's got very slick and professional indeed and very easy to use If the football pools are something you occasionally enjoy then this is an entertaining and maybe even lucrative way of getting your Amstrad in on the act too

**Program** *Amstrad Draw 2*
**Price** *£12 95*
**Micro** *Amstrad (with disc)*
**Supplier** *Amstra Draw 1 Cowleaze Chinnor Oxford OX9 4TD*

## AN APOLOGY

QL games are getting rather embarrassing; nobody expected much from the first few offerings but the machine has now been around for ages and there's still a need to 'apologise' for the fact that the games are so naff and treat them in the understanding way one might treat a budget game on the Spectrum.

The reason for this is, Paton's *Chess* excepted, nobody anywhere has produced a good game for the machine. Worse than that no-one has produced anything that gets near top Spectrum or Commodore games

So we come to *Quazimodo* – a game somewhat withered by age and staled by a lack of infinite variety on the QL! A 68008, 128K machine! What are we to make of it?

This version of the game by Shadowcraft is by no means a poor offering when compared with other QL games but in other comparisons it's dreadful

The screen scrolls unevenly, the sprites are simple, the sound (of course) is limited and there is little by way of interesting detail or animation. It is simply a fairly basic version of *Quasimodo*

At £12 95 it's cheap by QL standards expensive by others

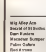




Since there are so few QL products out there I'd say buy it – it's cheaper and better than most, but why are QL games so awful?

**Program** *Quazimodo*
**Price** *£12.85*
**Micro** *QL*
**Supplier** *Shadow Games 70 Gooseacre Cheddington Leighton Buzzard Beds*

# This Week





| | | | | |
|---|---|---|---|---|
| **Mig Alley Ace** | Arc | Atari | £9 99 | US Gold |
| **Secret of St Brides** | Ad | Spectrum | £5 99 | St Brides |
| **Dam Busters** | Arc | Spectrum | £9 99 | US Gold |
| **Macadam Bumper** | Arc | Spectrum | £7.99 | PSS |
| **Pakes Galore** | Arc | Spectrum | £2 | Lee Griffiths |
| **Red Arrows** | S | Spectrum | £9 95 | Database |
| **Space Escort** | Arc | Vic 20 | £1 99 | Atlantis |

**Key: Ad** adventure **S** – strategy simulation
**Arc** – arcade **Ut** – Utility

**Activision**, 15 Harley House Marylebone Road London NW1 01-486 7588 **Atlantis**, 19 Prebend Street London N1 8PF 01 226 6703 **Audiogenic**, 39 Sutton Industrial Park, London Road Reading, Berks 1AZ 0734 664646 **Blue Ribbon** Silver House Silver Street Doncaster, South Yorkshire DN1 1HL 0302 21 137 **CCS** 14 Langton Way, London SE3 7TL **Database** Europa House 68 Chester Road Hazel Grove, Stockport SK7 5NY 061 456 8383 **Digital Integ**, Watchmoor Trade Centre Watchmoor Road, Camberley Surrey GU15 3AJ **Eight Day** 18 Flaxhill Moreton Wirral L46 7UH 051 667 1581 **Kuma, Kuma Computers** 12 Horseshoe Park, Pangbourne RG8 7JW 07357 4335 **Lee Griffiths** 9 Heys Avenue, Rainford Merseyside WA11 8AW **PSS** 452 Stoney Stanton Road Coventry CV6 5DG 0203 667556 **Sinclair** Stanhope Road, Camberley Surrey GU15 3PS 0276 686100 **St Brides,** St Brides School Burtonport County Donegal Ireland **Talent** Curran Building 101 St James Road Glasgow G4 0NS 041 552 2128 **US Gold** Unit 10 The Parkway Ind Centre Heneage Street Birmingham B7 4LY 021 359 3020



## Unadventurous

I'm worried about computer games I think that the titles on offer are becoming sectionalised, stereotyped and rather unoriginal

I find that somewhat alarming considering the whole market is really only five years old

I am thinking particularly about adventures As a reviewer I get to see many examples of this genre and, without wishing to trespass into the territory of Tony Bridge or tread on the toes of too many orc-slayers, I would like to propose that there's something severely wrong with it

What I find lacking is just that quality which its name professes. According to my dictionary to adventure means to incur risk to hazard oneself or to dare enter an undertaking So why, all too often, do I find myself collecting a lamp and entering the cave? It's more like doing the weekly shopping than being a brave warrior!

The answer is, of course, partially historical This is the form that those first main-frame adventures took When it became possible to transfer all those locations to the home computer somebody did just that. There are still many versions of that original classic around today It soon became the model for many imitators and so the term adventure came to have a specific meaning

Now I happen to think that Gilsoft's *Quill* is a wonderful utility I also believe that its users have a lot to answer for Too many *Quill*-ed adventures fail to show any signs of imagination. They dump the player in a landscape full of elves, locked doors and yes, object after object to collect. The 'adventure' becomes an exercise in puzzle solving more suited to a book of lateral thinking problems or a cryptic crossword. We are made to think but we learn nothing and there is no real sense of risk or daring

The main satisfaction in this kind of adventure comes when it is well written so that the narrative and descriptions sweep the player along and that involvement overcomes an underlying sense of the program's mechanics Similarly an original setting, such as the town of *Urban Upstart*, may help disguise the formula, and the satire of *Hampstead* could even tell us a little about the social levels of the country we live in Eventually, though I am forced to recognise that these are only exercises of the intellect

A possible way of adding the physical aspects of timing and hand/eye co-ordination is through the arcade adventure, but how many conservative traditionalists refuse to accept these programs as part of their genre? Certainly early pretenders to the title had very limited similarities Some more recent examples have been incredibly sophisticated. A recent preview of one important game out this autumn reveals a combination of mapping and problem solving with fighting and manipulating objects in a 'real' 3 D space

An alternative is the approach of *The Fourth Protocol* which places you in the hot seat as spy-master, receiving messages, searching the files and allocating resources in an attempt to overcome a plot to destroy Britain. Not an elf in sight and no torches or flints, but as far as I'm concerned it has enough action to keep the player constantly on edge Do you actually set a tail on that suspect? How do you respond to the unusual absence from work of a high-ranking official?

I call that an adventure but many people would disagree The definitions of game type have fast become concrete and people look no further than *Go East* and *Take Torch* for their adventuring

I believe such narrow-minded definitions will make the genre increasingly unadventurous and badly supported

**John Minson**



## Musical numbers

**Puzzle No 170**

The Musical Appreciation Society at Greyfriars School has a sextet of members whose names are curiously appropriate Grieg Offenbach Rossini, Scarlatti, Schumann, and Sullivan

The other day young Tommy Grieg (who is also a keen mathematician), noticed that the cube of 28 – this being the number of his sports locker – was 21952, and thus corresponded with the letters in his surname. That is, of the five digits in the number, the first and last were alike, while the rest were different Similarly, in his name the first and last letters were identical and the rest were different

Can you say what locker keys the other five boys should request if they too wish to enjoy this unusual property?

**Solution to Puzzle 165(ii)**

Paula – Stanley 21ft    Rachel - Stanley 72ft
Paula – Quentin 45ft    Rachel - Quentin 60ft

```
10 LET HYP=75
20 FOR N=1 TO HYP-1
30 S=SQR(HYP*HYP-N*N)
40 LET S=VAL(STR$(S))
50 IF S=INT(S) THEN PRINT N;S
60 NEXT N
```

As the girls *P* and *R* were standing on a diameter of the pond then the angles subtended at all points on the circumference will be 90 degrees Consequently the puzzle requires us to find two different right-angled triangles having a hypotenuse of 75 feet, and legs which measure an exact number of feet

In the program, one of the legs is given an integral value from 1 to 74 in sequence and the length of the other leg is evaluated by using Pythagoras' theorem. If the resulting value is integral then the two dimensions are printed. From the data so produced, and using the additional information in the puzzle the relevant distances can be easily assessed.

**Solution to Puzzle 165 (ii)**

The winner is R A Matulko of Lymm, Cheshire, who receives £10

**Rules**

The closing date for Puzzle No 170 is September 11

## The Hackers

-Talk in the village is you be the best man in these parts at fixing rams...

COUNTY COMPUTERS

Well, at the risk of seeming immodest..

Right!-I'll fetch it in.

GLOW

BEAM

RAM CARDS



48K Spectrum

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